SKYWAYS

MILITARY ★ CIVIL ★ COMMERCIAL AVIATION

Special

Air Navy Issue featuring PHOTOS of 32 NEW U.S. NAVY AIRCRAFT plus Plane Facts & Figures

's Report....1949 Cessn

BUZZ BOMB BEATS BOOKS

. . . for training in Aeronautical Engineering

If you were at *Northrop* preparing for a career in Aeronautical Engineering you could step out of your classroom and study this "buzz bomb." It would bring to life your classroom topics and textbook knowledge . . . for this unusual aircraft illustrates principles of aerodynamics, advanced aeronautical design, and methods of flight control for all-wing, jet-powered aircraft. Studying it changes dry theory to practical knowledge in short order.

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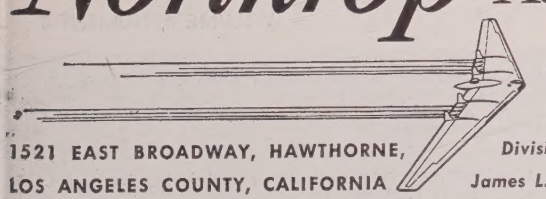
This heavily illustrated booklet tells you about Aviation's splendid opportunities . . . and describes in detail Northrop's 2-year *Aeronautical Engineering* course and 50-weeks CAA-approved *Aircraft and Engine Mechanics* course.

Northrop Aeronautical Institute



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Please send information on opportunities in Aeronautical Engineering, your catalog, and starting dates of classes. I am interested in:

☐ Aeronautical Engineering • Aircraft & Engine Mechanics ☐

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SKYWAYS

Cover: Martin AM-1

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A Complete 4 place Plane

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Never in the history of aviation has so much been offered for so little. Piper, always the leader in low-cost practical aircraft, has done it again with the sensational new 4-place Piper Clipper—priced at only $2995.

Here's a brand-new airplane with remarkable performance and lots of roomy comfort—backed by Piper's 18 years of leadership in the light plane field.

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But the performance is even better than the price. Top speed is 125 mph, full-load rate of climb is 600 feet per minute (over 1200 FPM solo). You've probably never flown a plane with as much "get-up and get-out."

You'll get a new idea of aircraft values, a new idea of personal plane performance—see your nearest Piper dealer for a demonstration.

For illustrated brochure, write Piper Aircraft Corp., Lock Haven, Penna., Dept. 5-SK.

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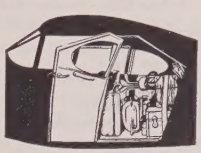

Rear seat is quickly removable for freight. Large rear door makes loading easy. 36 cubic feet capacity.

PLENTY OF ROOM

There's plenty of room in the Clipper. Front seat is adjustable for added comfort.

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"Round-the-world" Lycoming with new Piper cross-over exhaust for extra take-off power, has starter, generator as standard.

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Station Wagon

AIR YOUR VIEWS

Great Lakes Trainer . . .

Gentlemen:

Mr. R. C. Dillon writes in the March issue that he is interested in getting a Great Lakes Trainer. There was one at Lash Lee Airport in Malvern, Arkansas. I saw it last summer.

I own a Luscombe *Silvereaire Deluxe* . . . and believe my Luscombe will perform better than the G. L. Trainer, and it's much more modern and practical.

ED. L. BERRY

Warren, Arkansas

Thanks for the info, Mr. Berry, and we hope Mr. Dillon finds it useful.—Ed.

Cover Dope . . .

Gentlemen:

I am curious to find out the name and type of aircraft pictured on the cover of your February issue. What make is it? What is its cruising speed, and is it a single-seater?

E. LANGE

Harmony, Minnesota

The Gulfhawk plane pictured on the February cover was a Grumman F8F bought by Gulf Oil. The F8F is a Navy fighter (called Bearcat*) designed for carrier operations. It is powered by Pratt & Whitney 1,700-hp engine; has top speed of more than 455 mph at 10,000 feet, and a 5,700 feet per minute rate of climb. The F8F is strictly a military airplane . . . and a single seater. The one pictured on the cover (and flown by Gulf's Al Williams) was demolished soon after that issue of SKYWAYS appeared on the newsstands. Fortunately, Pilot Williams was not injured, although the plane was destroyed.—Ed.*

Petulant Porpoise . . .

Gentlemen:

In your February issue, X-Country, you ran a picture of a plane called "Petulant Porpoise." Would you please tell me what company designed and built it, and could you give me some other information about that plane?

TOMMY PRICE

Decatur, Illinois

Actually that plane is a modified Widgeon*, originally designed and built by Grumman Aircraft Engineering Corporation, Bethpage, Long Island, N. Y The modification, however, was done by Edo Corporation, College Point, N. Y. New hull designs, scaled down to fit this* Widgeon*, are flight tested on it as part of a Navy-NACA research program. Edo Corporation might be called "Consultants" in this program. Latest information about the Petulant Porpoise is that it recently was damaged in testing a new hull design and for the time being is in a sort of drydock, pending study and repairs. For more information, might we suggest you write NACA (National Advisory Committee for Aeronautics), 1724 F. St., NW. Washington, D. C.—Ed.*

1930 Vintage . . .

Gentlemen:

Could you tell me where I could get information about the Pilgrim 100? It was probably built in the early 30's.

Also, I would like to have the address of the company building the Johnson *Rocket* and the Republic *Seabee*.

S. JENKINS

Kokoma, Indiana.

The Pilgrim 100 was built by the American Airplane Company, a business concern no longer in existence. The ship was a nine-place cabin land monoplane powered by a 575-hp Pratt & Whitney engine. It had a cruising speed of from 110 to 120 mph and a range of 600 miles. It had a gross weight of 8,100 pounds. Neither the Johnson Rocket *nor the Republic* Seabee *are being built today.*—Ed.

Wrong Pew . . .

Gentlemen:

I think you've made an error in your March issue . . . on page 30 you call that plane the Martin *Marauder*. Actually, it's the Douglas *Invader*.

JOHNNIE L. JONES, USN.
Yeoman School 12A
NOB, Norfolk, Va.

Right you are, Sailor. The caption writer got his new and old designations mixed up . . . and it threw him into the briny deep. Our apologies to Douglas . . . and our thanks to several other alert readers who caught us with our slip-up showing.—Ed.

Mechanical Age . . .

Gentlemen:

In Dilbert (March issue) you said that Dilbert should have raised his flaps and then swung around for another shot. To my notion this would have depended on the type of plane flown by Dilbert. I'm no authority on the matter, but I've flown several types that drop right out from under you when the flaps are raised.

R. E. SMITH

Selma, Alabama.

We asked Warner and Osborn about this . . . and here's the reply, "Right you are! Dilbert's airspeed at the time the tower gave him the red light is unknown, but it might have been too low for safely raising flaps. For a fuller explanation of this point, see "Flap Speed" in Dilbert this issue." Okay? And thanks a lot, Mr. Smith, for your letter. We appreciate your point. By the way, you might enjoy Downie's Cessna *170 report on its flap action.*—Ed.

Engine Query . . .

Gentlemen:

In your October issue you published a picture of what you called an F-80. It was an illustration for the Shoulder Harness article. To me the engine looks more like a radial than a jet engine. Am I right—or wrong?

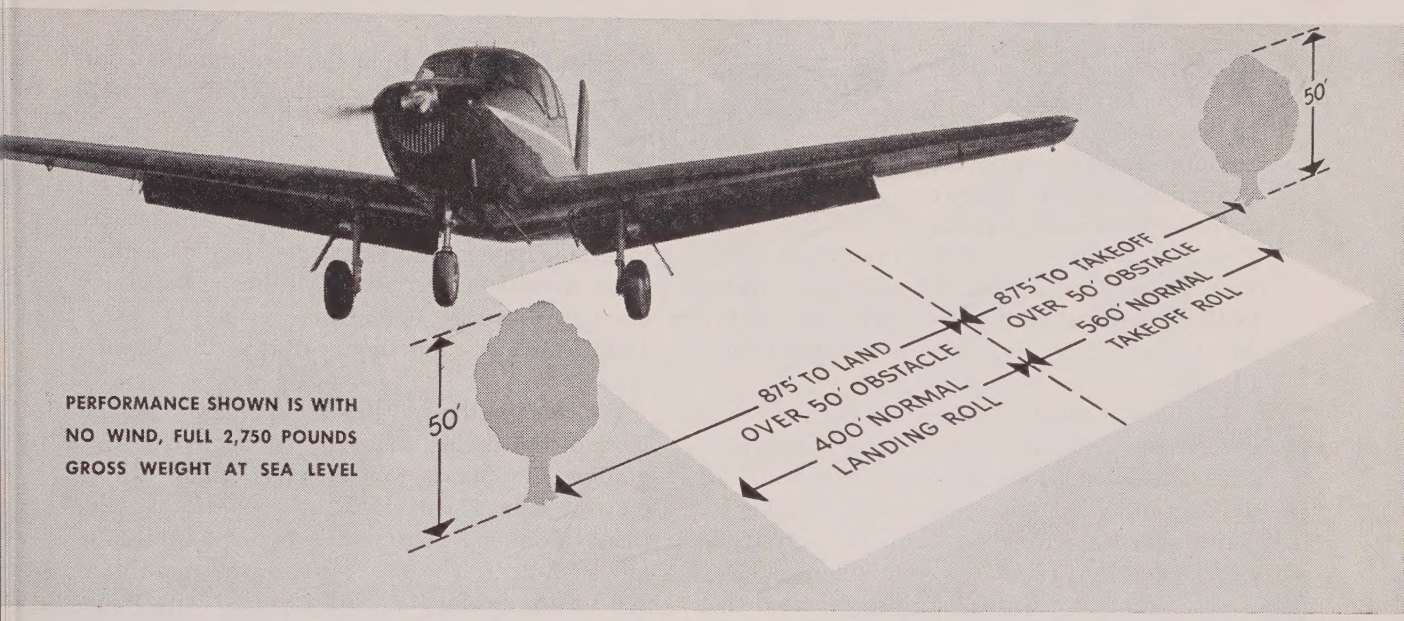
R. W. DAVIS

Norwell, Mass.

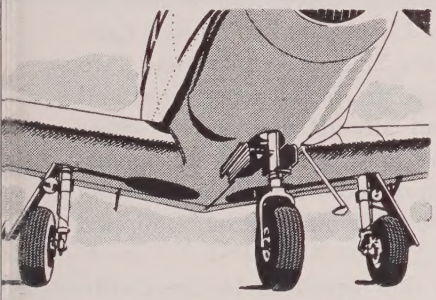
Wrong. It's a jet engine and that part of it that seems to indicate it's a radial reciprocating engine is probably its burners.—Ed.

SPEAKING OF SHORT-FIELD PERFORMANCE!

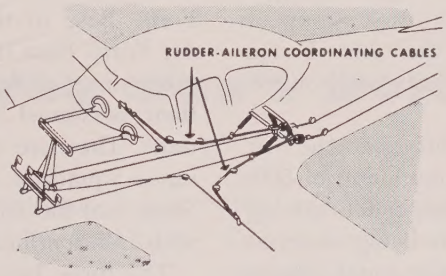
THE '49 RYAN NAVION IS IN A CLASS BY ITSELF!



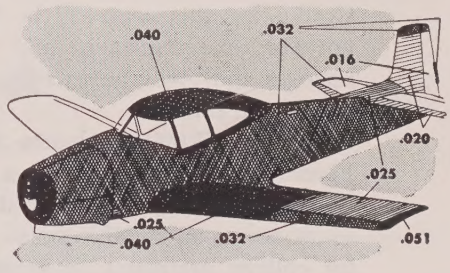
DON'T WORRY if that smooth, concrete runway is miles from where you want to go. A *Ryan Navion* will take you into short, rough strips... and out again, with ease and safety. Think of it! *Navion* lands at only 54 m.p.h. with full gross load. Its high-lift, full-deflection flaps lower 43° to make possible slow, steep approaches. Only 875 feet are needed to clear a 50-ft. obstacle—both on landing and take-off. *Navion's* husky 205 h.p. engine will give you 900-ft. of altitude in your *first minute* of flight! Performance like this is mighty important to the man who wants a rugged, versatile plane with plenty of utility that'll get him there and put him down right where he's needed. Yes, *Navion's* short-field performance is a big reason why it's the growing favorite among businessmen pilots.



WIDE WHEEL TREAD and high ground clearance...big, steerable balanced nosewheel and oversize tires enable you to set the *Navion* down smooth as velvet on rough, soft fields, even in cross winds. Big, equalized hydraulic brakes ease ground-handling. Deep-stroke hydraulic shocks are real heavyweights.



SAFE, AND EASY-TO-FLY, the 155 m.p.h. *Navion* has amazing stability, is gentle and well-behaved..."forgives" pilot error short of foolhardiness. It features "two control after take-off"...yet you have rudder when you want it. Stall-resistant wing gives aileron control *below* stalling speed for safety.



BIG AND RUGGED, the thick-skinned, all-metal *Navion* represents highest structural integrity in aircraft design. Low maintenance cost and permanent beauty are assured. Send now for colorful, FREE brochure which gives complete details on all 29 dramatic advancements in *Ryan Navion* for '49.

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- Improved Control Panel
- More Instruments
- Dual Fuel System

USAF NEWS

A NEW record for loading an Operation Vittles C-54 has been claimed by a German crew at Celle, according to a recent announcement in *Task Force Times,* daily bulletin of the Combined Airlift Task Force. The regular 12-man crew loaded 19,580 pounds of coal into a *Skymaster* in five minutes and 45 seconds. Normal loading time is 16 minutes.

The crew, which was not hand-picked and did not employ any new loading techniques, asked Lt. Colonel John M. Grant, commander of the rear airfield supply organization at Celle, for permission to try for the record. He okayed the request and timed the crew with a stopwatch.

The *Task Force Times* has also reported that an air shuttle run for Vittles troops on pass is now in operation between Fassberg and Copenhagen. According to the *Times,* "Danish officials have extended a warm welcome to American personnel, and allow them to enter the country without visas or any sort of red tape."

THE U.S. Air Force is making a strong bid for graduates in June classes at all colleges. Graduating this year will be the first group of postwar ex-servicemen and the Air Force believes they will be exceptionally well suited for pilot training.

Of the 125,000 graduates this year the Air Force would like to sign up a minimum of 500. And to make the offer for aviation cadet training as attractive as possible space is being reserved for college graduates in aviation cadet classes scheduled to start June 29 and August 10.

As part of the campaign the Air Force is sending a personal letter to every Air ROTC graduate telling him of the opportunity to go through pilot training as an officer on flight pay up to $372 a month. A letter is also going to every college president advising him of what the Air Force has to offer college graduates in pilot training and Officer Candidate Schools. Employment counselors at all colleges are being informed of the U.S. Air Force program also.

USAF's newest jet fighter, the Republic XF-91 interceptor, is now undergoing flight tests. The XF-91 is powered by a turbo-jet engine and incorporates rocket motors for accelerated take-off and climb and for operations at high altitude. Both the wings and tail surfaces of the XF-91 are swept back.

MORE than 1,800 tons of cattle feed, food rations, medical supplies, and emergency medical equipment were delivered by USAF during its 24-day emergency airlift operations to supply snowbound ranchers and their cattle in the Nevada area.

Ranchers in the snowbound area accompanied most of the flights, made by C-82's and C-47's, guiding the planes to the "drop zones" where crew members jettisoned the supplies as the planes skimmed above the snow at altitudes as low as 50 feet. The C-82's completed more than 300 sorties during the 24-day period with pilots logging approximately 1,152 hours of flying time. The C-47's flew 148 sorties and were airborne for about 288 hours.

THREE USAF bases and three units are involved in the recent reduction of forces in the Caribbean Air Command. The 319th Fighter Squadron, an all-weather outfit equipped with North American F-82 *Twin Mustangs,* moves from France Air Force Base in the Canal Zone to Moses Lake Air Force Base in the State of Washington. Two other units at France are being deactivated and their personnel and aircraft assigned to other units. They are the Fourth Tactical Reconnaissance Squadron, equipped with RF-80 *Shooting Stars,* and the 161st Liaison Squadron, equipped with L-5 *Sentinels.*

The three bases now operated by the Caribbean Air Command, all to be inactivated soon, are Atkinson Air Force Base in British Guiana, Beane Air Force Base on St. Lucia, and Coolidge Air Force Base, Antiqua, British West Indies.

USAF's new all-weather jet fighter, the Northrop XF-89, has been named *"Scorpion".* It is now undergoing flight testing at Muroc Air Force Base.

USAF has announced that Major General Joseph H. Atkinson, Commanding General of Alaskan Air Command, has been reassigned as Commanding General of the 311 Air Division, Reconnaissance, Topeka Air Force Base, Kansas. New commanding general of Alaskan Air Command will be Brigadier General Frank A. Armstrong, Jr.

Young man's world

These four men caused a minor business revolution 0 years ago by new field-selling techniques in a ationwide business.

But the more the new company grew, the more these en-with-vision were bound to the home office. They ere becoming mere legends to employees in the field. he business began to slow down.

But not for long. The company bought a twin- igine Beechcraft Executive Transport and put fleet place Bonanzas in the field. Because these business anes can make a 75% reduction in business travel-time, adequate field work was once again possible. With new and complete mobility of action, management really started managing again.

Now their business is bigger than it ever was before, and there's even more time for rest and relaxation. They're youngsters again in a young man's world—and this is something the most fabulous salary could not purchase for them.

● A note on your company letterhead will bring an informative 60-page brochure on "The Air Fleet of American Business." Address Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

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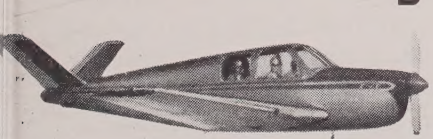
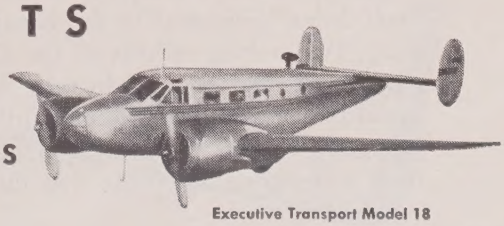


Bonanza Model A35



Executive Transport Model 18

NAVAL AVIATION

You never can tell what you'll meet in the middle of a cloud. The crew of a P2V-2 Lockheed *Neptune* from VP-6 cites this story as proof.

With a fair ceiling for Aleutian weather and the usual snow and rain storms not too far off, the crew took off for a routine local-area flight. Shortly after take-off, it flew through a harmless-looking snow cloud. Suddenly, to everyone's amazement, there was a loud crack.

A huge ball of lightning enveloped the nose of the plane and as the crew watched, the lightning spread out to each wing tip. Needless to say, all hands were scared stiff. After a quick check of all instruments and electrical equipment, everything seemed to be normal and the hop was completed.

Upon landing, a thorough inspection was made of the plane. There was no visible damage to the aircraft outside of a few pits on the skin. However, the crew chief claims that it was weeks before he had to use a power outlet to run his electric razor. He swears that all he had to do was hold the plug in his hands!

Heading the lists of Reserve components on training cruises for 1949 were two Naval Air Reserve squadrons from NAS Glenview, Ill., which boarded the carrier *Cabot* at Pensacola, Florida early last February. Operating in the Caribbean and the Gulf of Mexico, the cruise provided the first opportunity to some 140 Reserve airmen to participate in carrier operations since the end of the war. Appropriately enough, the *Cabot* recently was reactivated from the mothball fleet where she had been laid-up since her duty with the famous Task Forces 38 and 58.

The cruise was a complete success and many "well-dones" were sent to the Glenview squadrons. Top-ranking officers of the *Cabot* stated that they would be glad to take these reserve squadrons into combat without further training. Piling up records of safety and hours logged, these Reserve cruises prove that there certainly is nothing weak about our so-called "week-end aviators."

Recently the pilot of an F7F Grumman *Tiger Cat*, called the GCA unit at MCAS El Toro, Cal., and requested that he be brought in for a landing as he had only 25 minutes of gasoline remaining . . . and no desire to "taste" the last drop.

The plane was brought around on the down-wind leg for a normal approach. However, it was erratic on its headings on the crosswind and down-wind legs. When the pilot refused to follow directions on the final approach, the controller gave him a wave off. The plane now had 12 minutes of gasoline remaining. An immediate Planned Position Indicator approach was started. The pass was successful and the plane landed without incident.

After hitting the deck, it was discovered that: (1) The pilot had just arrived from flight school; (2) It was his first night flight in an F7F; (3) He had never flown GCA before; (4) The plane had a defective gyro compass and, if that wasn't enough, (5) The radio was operating only intermittently. Sic semper paratus!

Not too long ago, a Navy pilot attached to a MATS squadron flying the Berlin Airlift tried single-handedly to relieve the food shortage. Boarding his R5D at Rhein Main for the Vittles run, he noticed that his cargo of flour for Templehof had not been secured by tie-downs. He was told that the flight clerk had gone for 50 more bags. Apparently the original load had been short this amount. On take-off, the pilot discovered that his run was much longer than usual and his required power settings were above normal.

Suspecting a strong overload, he checked the bags as they came off the plane at Templehof. The count revealed that he had carried 297 bags of flour totaling 26,730 pounds instead of the normal 21,000-pound load. He had flown almost three tons more than the required . . . or permitted amount.

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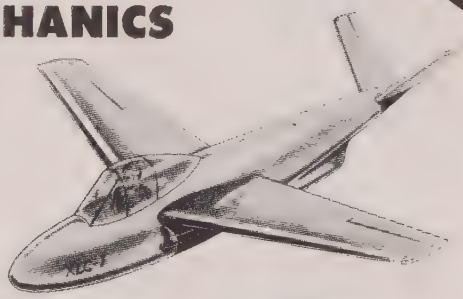

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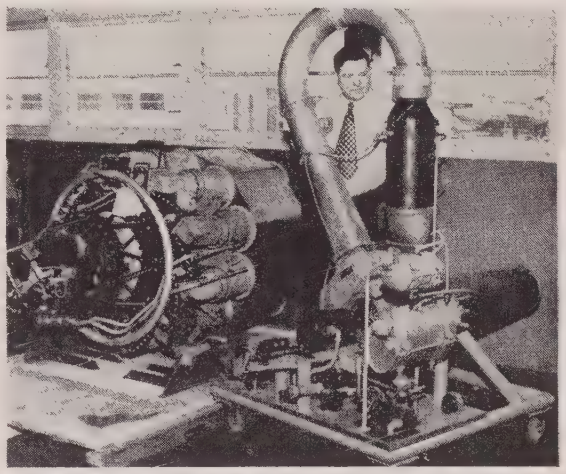
We have trained thousands for successful careers. We can do the same for you.

WE HAVE THE EXPERIENCE—THERE IS NO SUBSTITUTE FOR IT

Board and Room available right here on Grand Central Airport—transportation is no problem, this saves you money.



CAL-AERO STUDENTS ACTUALLY DESIGN ORIGINAL MIDGET JET PLANE — IN ADDITION THEY HAVE DEVELOPED AND ARE BUILDING ITS JET POWER PLANT

This is a forerunner of possible future jet powered personal planes. This single place jet airplane and 240-lb. thrust jet engine has been developed and is being built in Cal-Aero's Engineering School. The upper sketch shown is the design study of the plane—the photo shows its tiny jet engine alongside a "big brother", a GE J-33 turbo jet. This actual developmental project is only a part of our modern streamlined training program that prepares "Cal-Aero" graduates to step directly into the best paying jobs

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S-5

PROP WASH

Aero Oddities

Road Work. Chicago pilot on trip to Cleveland spotted flight strip along lake shore, thought it was Lake Front Airport. Pilot landed his plane, dodged a car or two on the runway, then climbed out to see why autos were permitted on airplane runway. Soon discovered he'd mistaken a driving school's practice roadway for Lake Front Airport. *(J. W. Buchanan, Medina, Ohio)*

Aerial Cowboy. Pilot at McPherson

DETACH AT BROKEN LINE

DEAR READER

Because we don't want to be caught up here with our flaps down, we're anxious for a word from you. SKYWAYS is your magazine, and as your editors we want to know what you want. Look over the questionnaire, then give us your answers. Reply promptly as only 100 readers will receive a free copy of the next three issues of SKYWAYS.

QUESTIONNAIRE

What stories and regular features did you enjoy the most in this May issue? On the lines to the right of the titles grade each article: 1—Good; 2—Fair; 3—Not interested in subject; or 4—Phooie!

Digest Nose-Diving Navy? .....——	*Navy Plane Album* .....——
Navy XF7U .....——	*Departments:*
Carriers Can Do .....——	*Dilbert* .....——
Pilot's Report: Cessna .....——	*USAF News* .....——
Experimental: USAF .....——	*Naval Aviation* .....——
Weekend Work-Out .....——	*Prop Wash* .....——
Needle, Ball and .....——	*Air Your Views* .....——
Winged Firepower .....——	*CAOA* .....——
Air Training Station .....——	*Civil Air Patrol* .....——

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Are you interested in technical or semi-technical articles?.....If so, on what particular subjects? ....., ..., ...
Would you like to read articles on personal flying experiences?.....
On flying experiences of World War II flyers?.....Are you interested in foreign planes: personal.....military.....Do you like Special Aircraft Sections such as Planes of Air Navy in this issue, or Personal Planes in April?.....What are your suggestions for future issues of SKYWAYS?.....
.....
.....

Something about you, but not too personal:

Name: ..... Address: .....
Pilot's License: Student.....Private.....Commercial.....ATR.....A&E.....
Military Rank:.....Today: Res. .....Active.....
Age: Under 21.....; 21 to 30.....; 30 to 40.....; 40 to 50.....; over 50.....
Do you own a plane?.....If so, what make?.....
If not, do you expect to buy one?.....

Fill out and mail to: Research Dept., SKYWAYS
444 Madison Avenue, New York 22, New York

ansas) Airport was requested to rch for farmer's cow that had caped" through hole in fence. Dis- ight farmer explained he was aid lost cow had calved and might d attention. Pilot flew low over a, spotted cow and newborn calf, naled ground party and led it to family. Both cow and calf are ng nicely. *(Mrs. P. J. Budden- g, Hamilton, Missouri)*

bit Forming. In pre-flight ses- n, instructor explained to student r the effect of torque on an air- ne. Taking student aloft for dem- tration, instructor said, "See how plane tends to pull to the left? w why does it?" Student lost no e in replying, "Probably because used to flying a left-hand traffic ttern and jes' naturally goes in t direction." *(M. Wolf, St. Peters- g, Florida)*

vigational Aid. Due to power rtage in large city on West coast, cials turned off a large neon sign vertising certain gasoline. Immedi- ly, Airline Pilots Association for- lly petitioned to have sign re- ted. Sign proved to be airline ts' favorite field beacon. It was mediately turned on again by au- rities who appreciated safety gle. *(D. T. Barry, East Orange, w Jersey)*

t Spin. Flight instructor briefed student with instructions for solo minute flight. "Spend 15 minutes ng low work, then spin for 15 utes from 3,500 feet or more," in- ctor advised. Ten minutes later o student was back at the field. ouldn't spin for 15 minutes," stu- nt told instructor, "the ship comes wn too fast!" *(L. Carlberg, Enid, lahoma)*

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

SUPERFORTRESS was being developed in 1939 . . . yet Seversky was being "prophetic" by pleading for B-19 in 1942

IS READER'S DIGES

By D. N. AHNSTROM

The Digest supports a single, land-based Air Force. Since such a move may be toward national insecurity—not security—SKYWAYS believes it is in the public interest to encourage you to search critically the conclusions reached in "authority" articles and to consider all sides of problems relating to air defense.—ED.

PONTIFICATES William Bradford Huie in the Reader's Digest (January, 1949)— "*. . . the American people must enter and win the fratricidal war between the armed services . . .*"

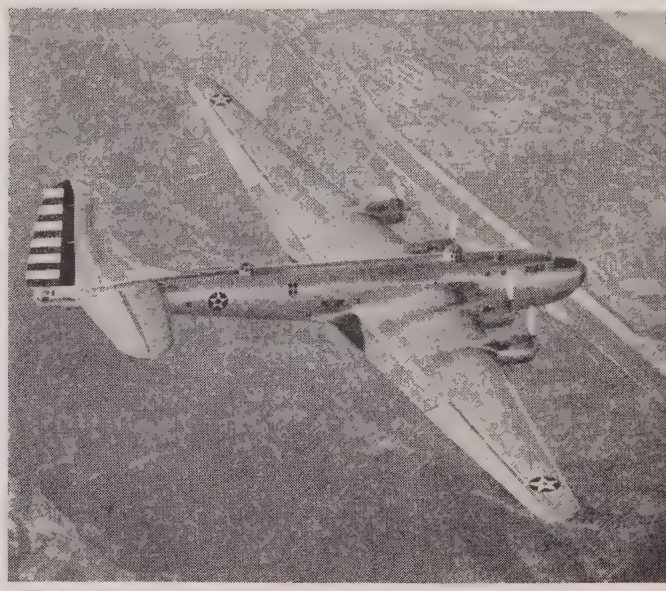
Now, if you needed surgery to save your life and if three brother surgeons were discussing how best to operate, would you ask a bunch of cow punchers to enter and add to the melee?

The cowboys, complete with spurs, might beat up the surgeons and "win the fratricidal war" but where would *you* be?

You'd undoubtedly prefer either of these two courses: Ignore the lot of Huie and leave the

PULP-PAPER generals call Navy's carriers "vulnerable" yet none of Essex-class flat-tops were sunk during war

FIGHTER armed with rockets has firepower edge over cannon-armed bomber, and only fighter can shoot rockets



COMPARE this "defenseless" B-19 touted by Seversky in 1942 with the well-armed B-29

OSE-DIVING OUR AIR NAVY?

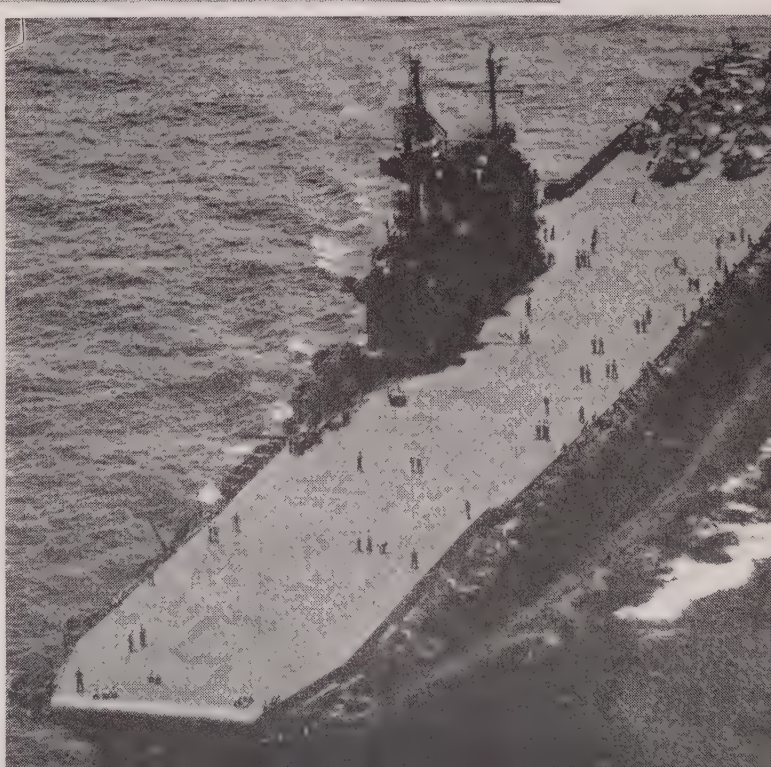
GROUND was broken for B-36 factory back in 1941 when so-called "prophet" was hitching his star to the B-19

decision to the experts, or study the best opinions on all sides of the problem and then pass judgment.

Therefore, if anyone wants to solve, not enter, the fratricidal war between the armed services he'd have to have the arguments from *all* sides. He wouldn't want to be part of a crew fed and fired by highly peppered lopsided apples until the whoop and holler downed all expert opinion.

The Reader's Digest has been feeding its readers just such indigestible messes of apples served up by the Messrs. Huie and Seversky.

The apples are highly *(Continued on page 45)*



JAP PLANES tried unsuccessfully to sink the "Big E" in war in Pacific. Instead, her fighters destroyed Japs

AIR NAVY'S XF7U

By JERRY LEICHTER

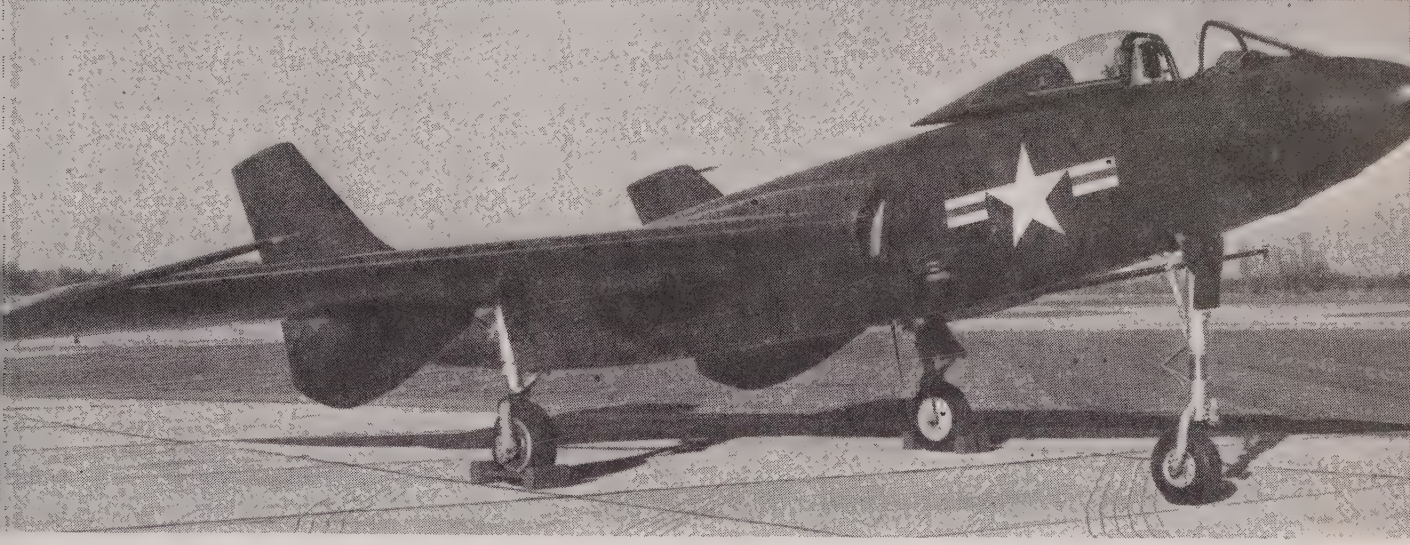
DON'T GO AWAY folks, you ain't seen nothin' yet. The cry of the old time barker seems singularly appropriate after taking a quick look at the new Chance Vought XF7U-1 *Cutlass*, the Navy's newest all-purpose jet fighter. In design, appearance, and possibly in performance, it is totally different from anything yet unveiled in the military jet parade. This tailless, swept-wing twin jet—with the tricycle landing gear of a light bomber and the appearance on the ground of some giant squatting insect—is expected by the Navy to be its fastest

NAVY'S test pilot is Captain Trapnell

first-line carrier fighter when its gets into production. Right now the XF7U is rated in the "over 600-mph class," but it was designed for speeds of more than 700 mph.

So much information about the plane is classified, restricted, or just plain "not available," that it's like a guessing game to figure out what makes this new jet job tick. The Navy has refused to pull back the blanket on the plane's dimensions, approximate weight, angle of wing sweep-back and engine model. But even with limitations it is possible to get a fairly good idea of the construction peculiarities and potentialities in the design.

First, although the XF7U has no conventional



CUTLASS, the Navy's new all-purpose swept-wing twin-jet fighter, was designed for speeds of more than 700 mph

tail assembly, it is not a true flying wing since at least one-third of the fuselage juts forward of the wing roots. It does have, however, some of the flying-wing characteristics, principally in its flight-control system.

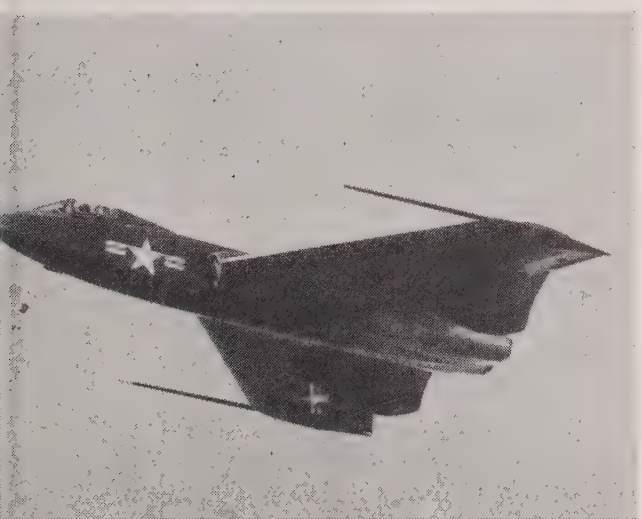
Second, the plane uses more magnesium, substituted for aluminum alloy sheet in certain areas, than any other aircraft yet developed. This, combined with the use of Metalite—the Vought-developed high strength metal sandwich material—in large skin areas; the stainless steel sheaths on the afterburner section, and the usual aluminum construction throughout the rest of the plane, makes it a very unconventional production item.

Third, it is the second aircraft known to use the Solar afterburner (in this case, two of them) to add extra jet boost at high speeds. The first was also Vought-designed, the XF6U-1 *Pirate* (SKYWAYS, Sept., 1948).

The single-seat *Cutlass* has to be dissected gently to be sure we don't miss any of its other features. The bubble canopy-covered pressurized cockpit, equipped with a standard pilot-

PILOT of XF7U rides high, about 10 feet up, behind the ship's needle-like beak which houses test instruments

PITOT TUBES mounted on jet fighter's wing tips (below) contained test equipment now carried in nose tube (right)



ejection seat, is set well forward at the nose giving the pilot exceptional round-the-clock visibility. Directly underneath the office floor is the gun bay, fitted for four packages, probably 20-mm cannon, two on each side of the fuselage.

The intakes for the engines are in the leading edges of the wing *(Continued on page 54)*

CARRIERS CAN DO

NAVY TEST showed patrol plane could take off from carrier. Author Cmdr. Davies was at the controls of this P2V

By CMDR [signature] USN

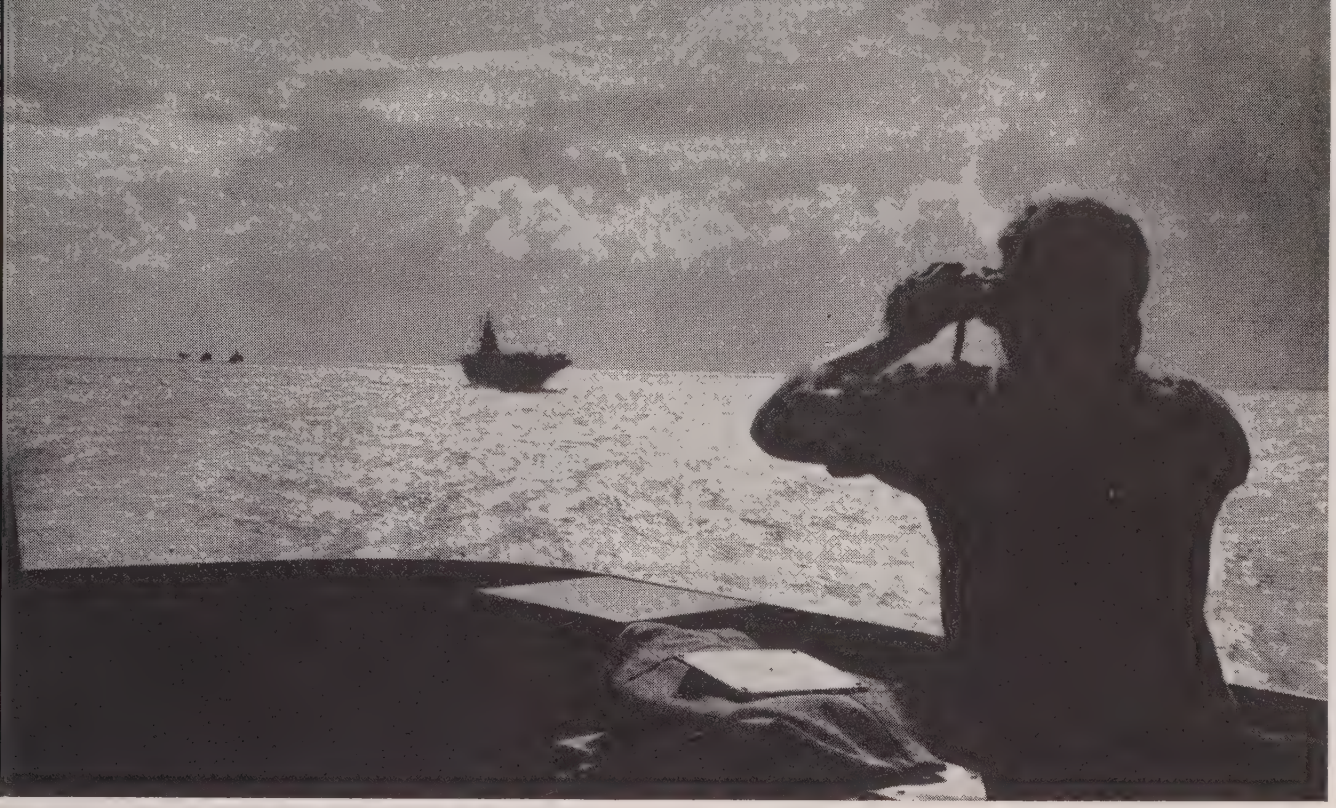
Exec. Office of Secy., Navy Dept.

As THE headlined facts of World War II slide farther into the past, they rapidly dim in the memory of the public mind. The question of the aircraft carrier and how it operates against other air power was not debated during the days of the battles of Midway, Coral Sea, Leyte and Okinawa. No one questioned the efficacy of the carrier as a weapon while those battles in the Pacific were being decided by those ships and their planes.

To have written a piece in those days defending the carrier and describing the manner in which it was able to carry out its missions would have brought raised eyebrows and the query, "Why bother to write this, everyone knows what the carriers can and are doing!"

Those were the days when the great fast carrier task forces of the Pacific were sweeping all before them. They were manned and their planes were manned by thousands of young Americans whose letters home, even more than newspaper accounts, convinced the American people that these Navy ships were one of the greatest weapons we had in our possession.

WORLD WAR II Navy pilots flying from carriers destroyed 12,268 Jap planes, 11,368 of which were land-based



NAVY CARRIERS of a Task Force are protected at sea by a ring of radar ships which provide air-tight radar "fence"

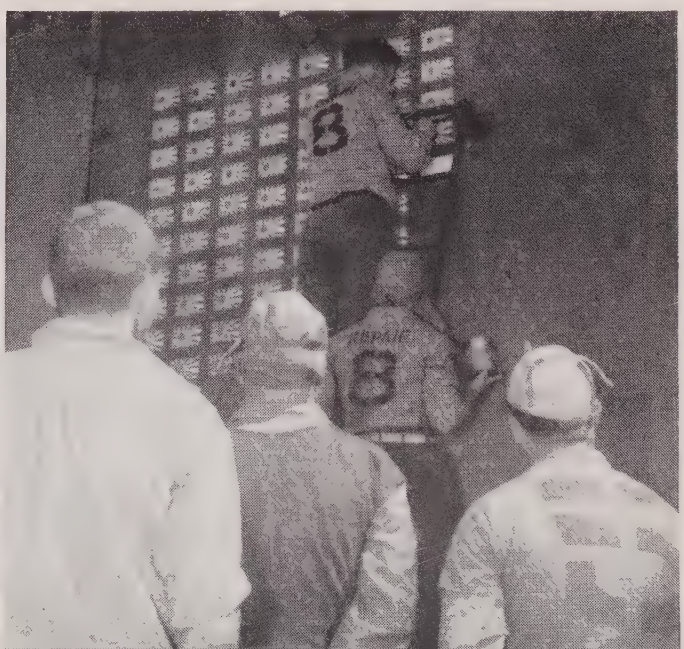
JET FIGHTER, bombers operating off flat-top decks can deliver knock-out blows to enemy at his own doorstep

With the coming of victory and at least the temporary passing of the military into the limbo, the carriers and their aircraft have become almost "the forgotten man". Recipients of only modest publicity they have oft times been the targets of attack in the American press by many so-called "military experts". Their place as the spearhead of the American Navy remains unchanged but the faith of the American people in their ability to operate against other air power has been somewhat shaken by the rapid advances of airplanes and weapons.

It is interesting then to see just how it is that these carriers were able to operate against land-based air power and successfully achieve their ends. It is important that we look into this most carefully at this time in order to discover whether or not the situation has been changed by the tremendous strides in the design and performance of airplanes that have taken place since the war. In addition, the atomic bomb has been produced—a weapon of terrific power, the effect of which, on our carrier operations, we must find out.

Recently, I have *(Continued on page 52)*

BATTLE RECORD of our Navy in World War II was unsurpassed. The Japs lost 18.4 planes to the carriers' one plane



Pilot Report... new CESSNA 170

By DON DOWNIE

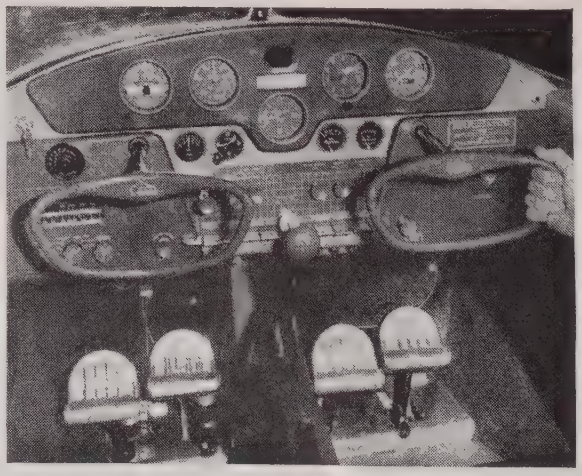
There's a gleaming new look in Cessna's four-placer, the 170. Most noticeable improvement in the 1949 version of the 170 is its all-metal tapered wing. Span and area are identical with the earlier fabric-covered model, but that's all! The metal wing is straight to the single strut junction and then tapers down 19 inches toward the tip. Both aileron and flap areas are larger than on the older model. Surprisingly, when these changes and additions were completed, they resulted in saving 15 pounds of weight; a distinct novelty in aircraft modification.

Essentially, the Cessna 170 is the same airplane with which SKYWAYS started this pilot report series last July, but so many refinements have been built into this new model that it is almost a new flying machine and a short once-over article is in order.

The new airplane used for this SKYWAYS article, N3844V, was the second new 170 to come off the factory production line. It was flown to the West Coast by Lee Renshaw of the Cessna sales department and displayed for Southern California dealers during a one-day demonstration at Glen Ivy Hot Springs, a resort about midway between Los Angeles and San Diego.

The Airport at Glen Ivy, located roughly 10 miles north of Lake Elsinore, is not much more than an improved meadow. In fact it's not even mentioned on CAA airways maps. The strip, slightly over 2,000 feet long, is high on both ends and has a low spot in the middle. Landings are normally made toward the south where a low, straight-in approach is possible. A bend in the runway near the south end angles up into a parking area ringed with tall oak trees. One might call it picturesque, but certainly *not* suitable for student instruction.

INSTRUMENT PANEL on the new Cessna 170 is well laid out. Beneath throttle in center of panel is radio microphone



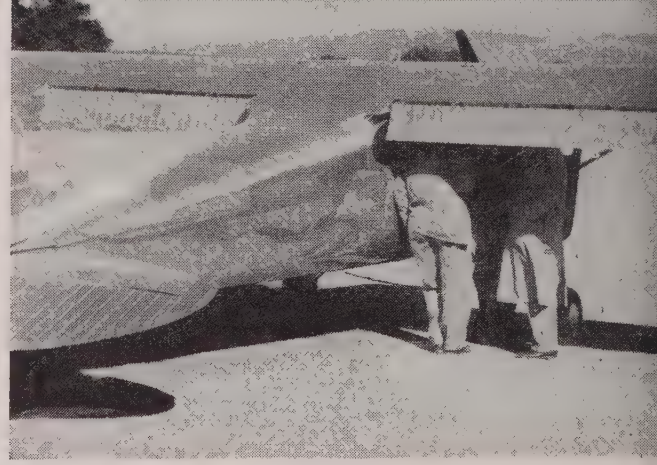
There was a brisk southeast wind blowing when we landed downwind at Glen Ivy after a 15-minute hop from "the smoggy city" in a plush 195 Cessna.

As the dealers and salesmen began to congregate we climbed into the new airplane with Lee Renshaw as check pilot. Slim Maxwell of Riverside and Ernie Epler of San Diego held down the back seat. Since Mr. Epler tips the scales at a "slight" 225, we made

NEW 1949 version of Cessna 170 features all-metal tapered wing and single strut, plus larger dorsal fin area

TURBULENCE was noticeable near ground (below) at Glen Ivy, but Cessna's new dorsal fin provided extra stability

CESSNA 170 flown for this Pilot's Report was equipped with Goodyear Crosswind gear. Note angle of the wheel



FLAP AREA has been increased on the 1949 Cessna 170. Full flaps dropped 50° reduced landing speed to 60 mph

this flight with at least full gross weight.

There are few changes in the cockpit so that any pilot familiar with either the 140 series or the older 170 could climb right into the 1949 model and take-off without a check-out.

After a quick run-up and mag check, we turned into the wind and opened the throttle. Even with this full load, the new 170 hopped into the air quickly and started right upstairs. The droop-snoot nose of the 170 makes for excellent visibility even in the steepest climbs. However, we kept the airspeed around 80 mph for the most efficient climb. The air was becoming choppy and an accurate rate-of-climb calibration was impossible, but the new model seems at least to equal the factory specification of 690 feet per minute.

Even though it weighs 2,200 pounds fully loaded, the new 170 flies like a light airplane. It is finger-tip-easy on the controls and a first-time pilot must keep one eye on the skid-ball dur- his first few turns to keep from overcontrolling.

At 2,000 feet, we trimmed the ship out for cruising. It indicated 120 mph with 2450 rpm. Then Mr. Renshaw asked for the controls for a moment.

"Look how stable she is with these new ailerons and larger dorsal fin," he said as he slapped one hand against the wheel and then let go.

The 170 started to duck a wing but returned immediately to level flight even though the pilot's hands and feet were off the controls.

After climbing a little higher above the orange groves near Glen Ivy, we experimented with stall and slow flight. The new 170 has a stall warning indicator installed as standard equipment. This handy gadget is located just to the left of the pilot's control wheel.

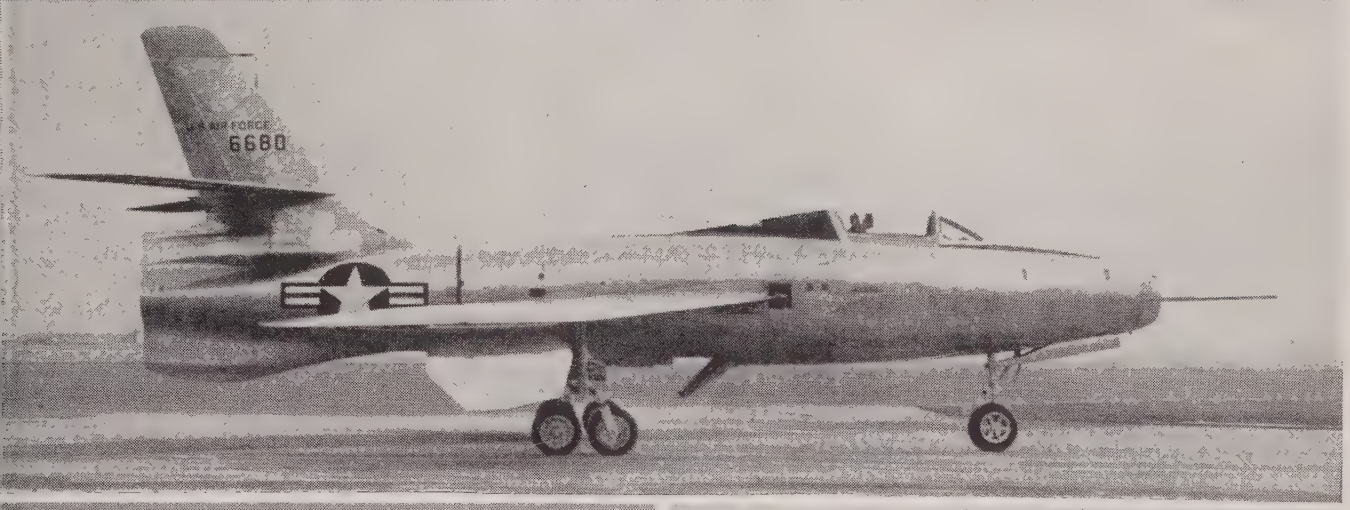
"Understand that this is *not* a CAA requirement," said Mr. Renshaw when the red light blinked on and the horn blared as we came all the way back on the control wheel. "We feel, however, that it is a positive step in the direction of increased safety."

Another innovation in the new four-place Cessna is found in the "feel" of the controls during a stall. Through a change in bell-crank linkage, there is the usual build-up of back pressure until just before the final pull back, as in a three-point landing. Then the pressure is relieved on the control wheel, making it easier to get the tail down on a landing.

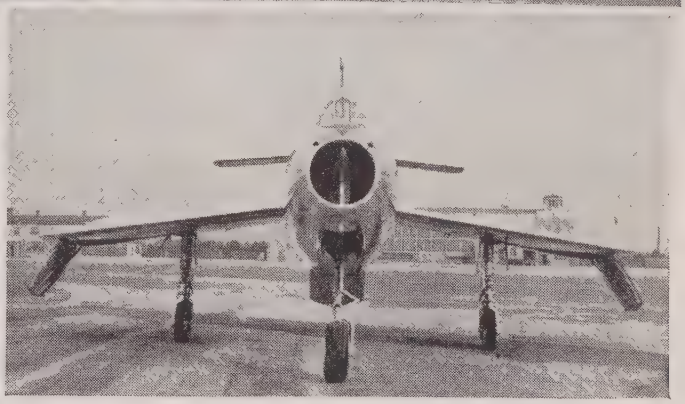
The ship is very docile in a stall, both straight ahead and out of turns. In a stick-back stall, fully loaded as we were, the 170 will wallow slightly if the wheel is held back against the stops for any length of time. However, just as soon as the pilot releases the slightest bit of back pressure, the ship gets right back flying again.

The cockpit noise *(Continued on page 49)*

NEW CESSNA 170 (left) and the old one (right) look alike except for the dorsal fin, new wing and the single strut

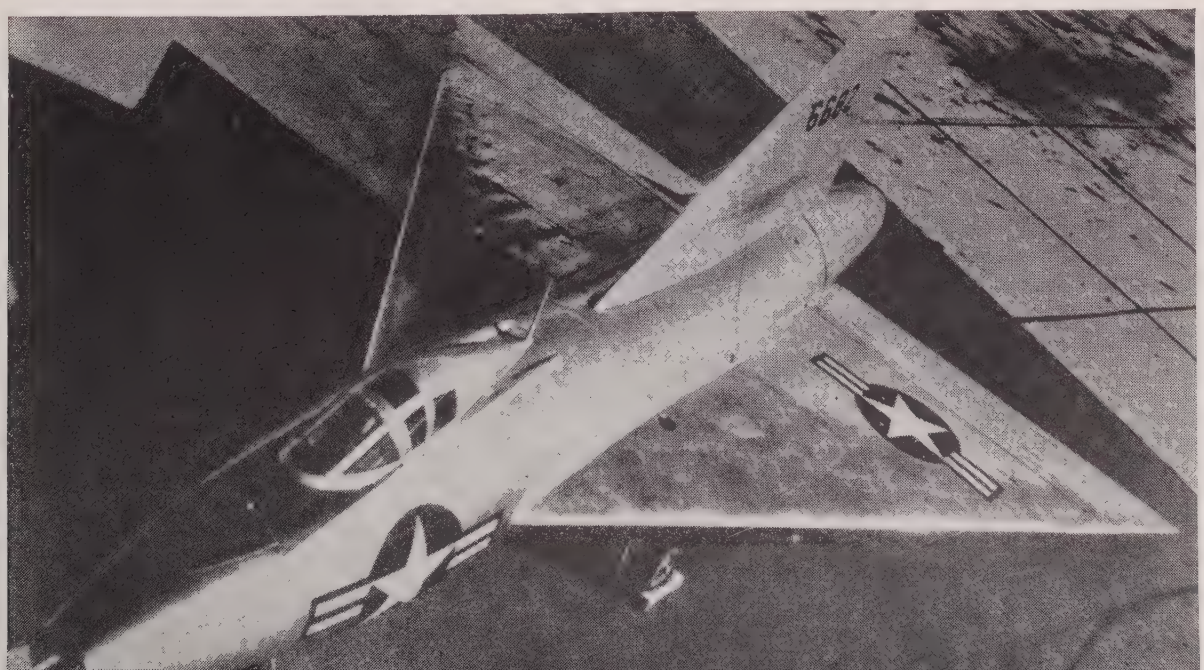


Experimental USAF

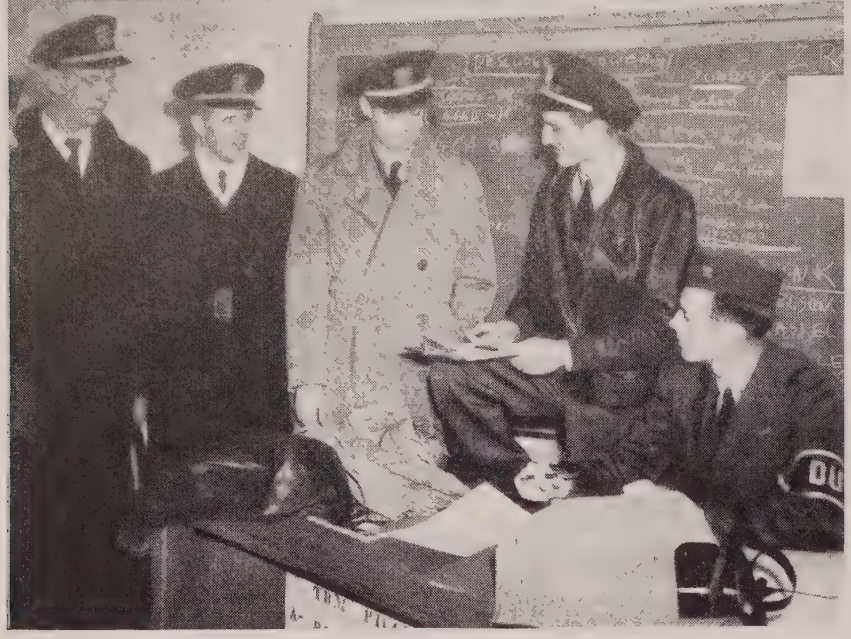


LOOKING like the folded-paper airplanes children used to make . . . but decidedly more lethal . . . is Consolidated-Vultee's new Model 7002 featuring a Delta wing (*below*). At present undergoing tests in California, the Model 7002 has a 60-degree sweptback wing, compared to the 35-degree sweepback on other USAF planes. This 7002 is powered by a J-33 Allison jet engine rated at 5,200 pounds thrust. Tunnel tests indicate Delta wing provides good control at high speed.

ANOTHER new military ship is the high-altitude interceptor fighter, XF-91 (*above*), designed and built by Republic Aviation Corporation, the company that gave the Air Force its famed P-47 *Thunderbolt* of World War II and the jet F-84. Powered by a turbojet engine, the XF-91 also has rocket motors for accelerated take-off and climb performance. Its razor-thin wings are swept back as are the horizontal and vertical tail surfaces. A bicycle-type main gear is used, with two wheels under each wing.



WEEKEND WORKOUT



RESERVE FLYERS report to their squadron office after arrival at Floyd Bennett Field. Blackboard behind the group carries notice that portion of the squadron will take off at 8:30 A. M.

THERE'S a civilian Air Navy in the skies these days. Once members of the Navy's combat team that brought defeat to the enemy in World War II, these boys today are Naval Reserve flyers who take off every weekend to keep keen and sharp the skill they perfected when active members of the Navy.

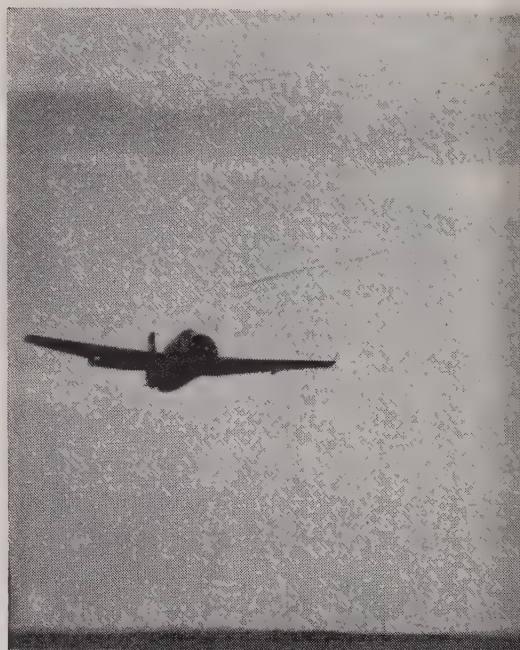
Today, boasting 27 stations in the U.S., the Naval Air Reserve Training Program gives refresher flight and ground school work to more than 38,000 Naval Aviation personnel, both officers and enlisted men. They are organized into regular carrier air groups and squadrons, and get paid for the time they serve.

The Naval Air Station at Floyd Bennett Field, Brooklyn, N. Y., where these photos were made, is one of the largest units in the NAR Training Command.

FLIGHT PLAN of Lieut. Cmdr. Nelson and Lieut. McIntyre is checked and cleared by Operations Officer, Lieut. Jensen

TAKE-OFF time nears and Lieut. Cmdr. Nelson, in TBM 126, waits on apron for Lieut. McIntyre to taxi up behind him

TBM'S roar off runway at Floyd Bennett in formation take-off for day's flight



LONG ISLAND SOUND beneath them, Naval Air Reserve officers at the controls of TBM Avengers run a simulated, combat formation tactic

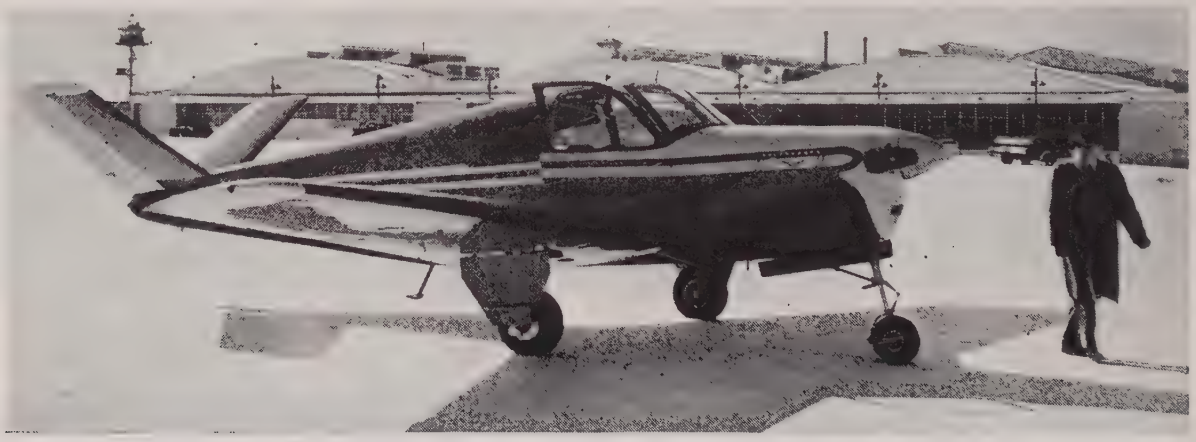
FLIGHT over and back on ground, NAR pilots Nelson and McIntyre fill out their day's flight reports

WEEKEND training over, Nelson and McIntyre drive back home

MONDAY MORN finds Lieut. Cmdr. Nelson back at his desk at J. C. Penny Co., and Lieut. McIntyre at the Polarus Co.

needle, ball and... oh hell!

PHOTO taken out of window of Bonanza at 13,500 feet gives idea of stuff Instrument Pilot Hazelton finally flew through



BONANZA N8473A was picked up at factory by its new owner, Ben Hazelton. Take-off from slippery field was tricky

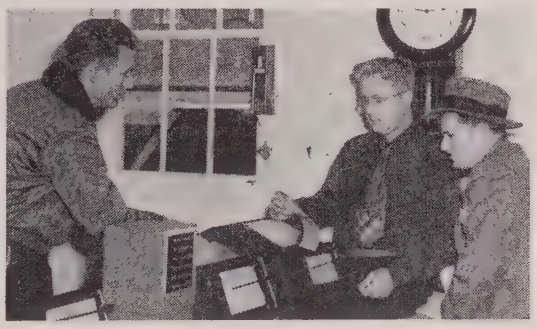
GROUNDED by bad weather for days, Hazelton finally made it through Banning Pass (below) to home base, Los Angeles

STUFFED CLOUDS, stuffed with mountain rock, that is, are reason enough for keeping pilots on ground in marginal weather

By CHASE CRAWFORD

"DAMN the weather!" The pilot turned away from the fogged-in-window of the Amarillo, Texas, Weather Bureau office and lit another cigarette. Here he was, nearly a thousand miles—and three storm fronts—from home.

Normally it wouldn't have mattered, but Ben Hazelton was expecting a call from the Stork at his San Marino, California, home within the next few days.



WAITING for "one more sequence," the author with Hazelton sweat it out at Roswell, N. Mex. airport

Outside a heavy layer of snow covered English Field, but Hazelton's factory-new Beech *Bonanza,* N8473A, was safely stowed away in the hangar. Inside, pilots drifted up to the Weather Bureau office, looked at the green-shaded maps and read the latest teletype sequences. Then they swore a little and went back to the Airport cafe for another cup of coffee.

It wasn't that Hazelton didn't know how to fly instruments. He had logged 6,700 hours since 1932, and held an Army "green" instrument card and had flown over 200 hours of actual instrument weather including a couple of GCA letdowns into Tokyo in a B-29—but he sat on the ground and swore softly.

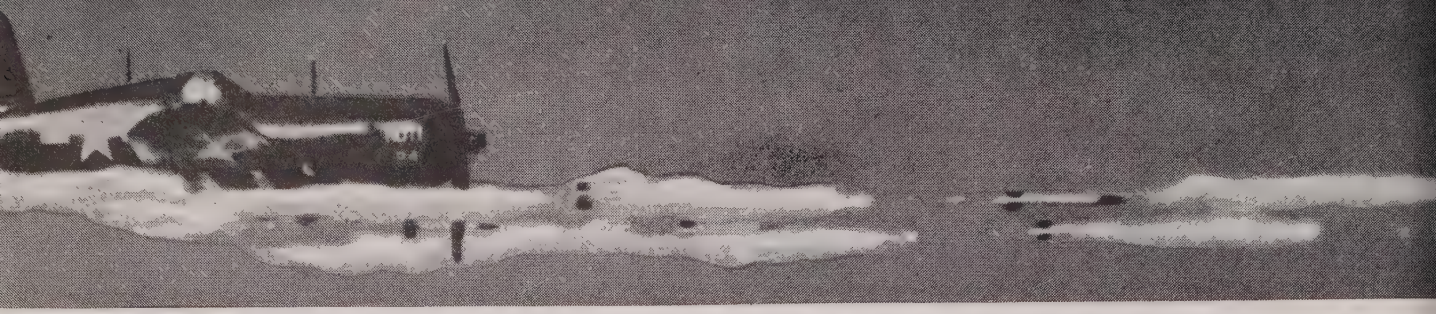
"What's the use of sticking your neck into that storm front?" he asked as he ground out another smoke. "There aren't enough instruments—or enough engines on my ship to take-off *deliberately* into that rough weather. Needle, ball and air speed are swell for simple letdowns and to make that 180° turn around when you accidentally plow into dirty weather, but the cards are stacked against you with a little airplane in stormy weather."

One of the regulation standing jokes of military pilots flying in bad weather was to hang their instrument rating on the fogged-in windshield. Then the pilot would grin over at his copilot.

"See, I can fly instruments in any kind of weather. The little card says so."

It was always good for a laugh.

After all, Air Force *(Continued on page 56)*



Winged Firepower

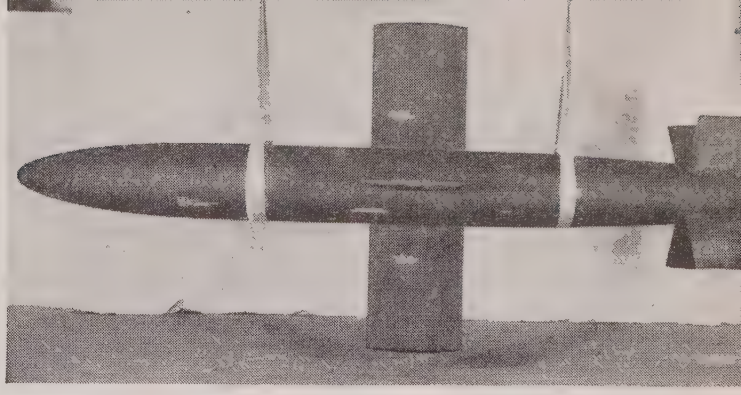
By CAPTAIN Sherman E. Burroughs Jr., U.S.N.

ARMAMENT that makes this AM-1 a hard-hitting fighter-bomber is its three torpedoes, 12 rockets and four forward-firing 20-mm guns. Thus armed, the AM-1 Mauler can attack surface vessels, submarines or shore objectives

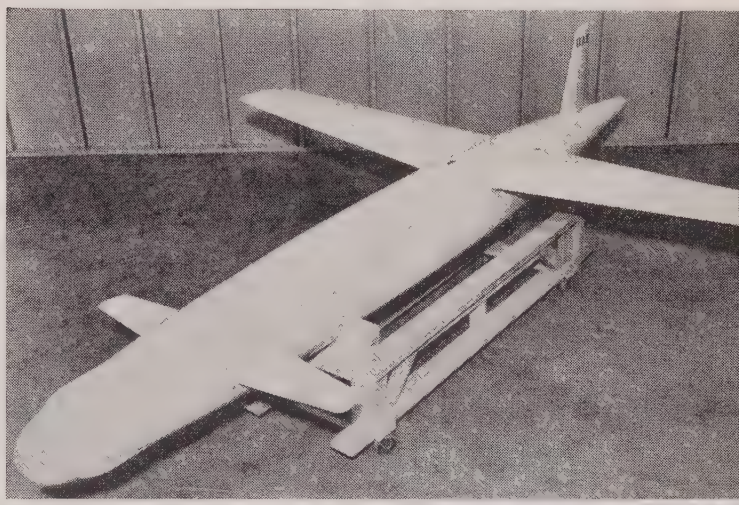
Captain Sherman E. Burroughs, Jr.

FIRE POWER, stemming from Aviation Ordnance, is in the final analysis the means by which we gain and maintain air supremacy in any contest with an enemy. All aircraft have requirements for high performance, dependability, safety, etc., but in weighing the tactical worth of any military aircraft, the effectiveness of its offensive and defensive ordnance is a primary consideration.

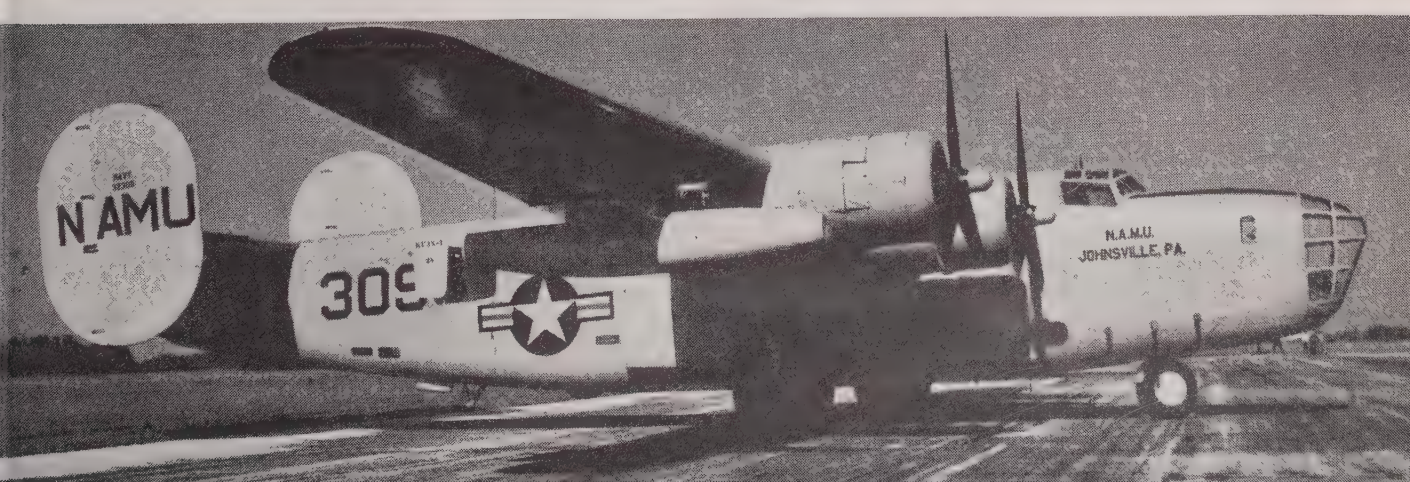
The role that Naval Aviation must play in support of Naval operations, and the limited number of aircraft which can be based on carriers, place challenging requirements on the quality and versatility of the ordnance with which naval aircraft must be fitted. Naval attack aircraft must be capable of delivering bombs, rockets, torpedoes or gun fire on successive attacks or even on the same attack, if need be. Navy fighters must be able to double as fighter-bombers. When attacking surface ships, submarines or shore objectives, one of the most stringent requirements for aviation ordnance equipment is extreme accuracy of fire control. A rocket, bomb, or torpedo which misses the target has no value other than possibly making the enemy uncomfortable. In sowing mine fields from the air, mines which do not land in shipping channels are not *(Continued on page 63)*



NAVY'S latest rocket-powered guided missile is the Lark, developed by Fairchild. Officially it is the XSAM-N-2. Speed of Navy's Gorgon (below), also rocket-powered missile, is listed as 550 mph. It carries 100-pound charge



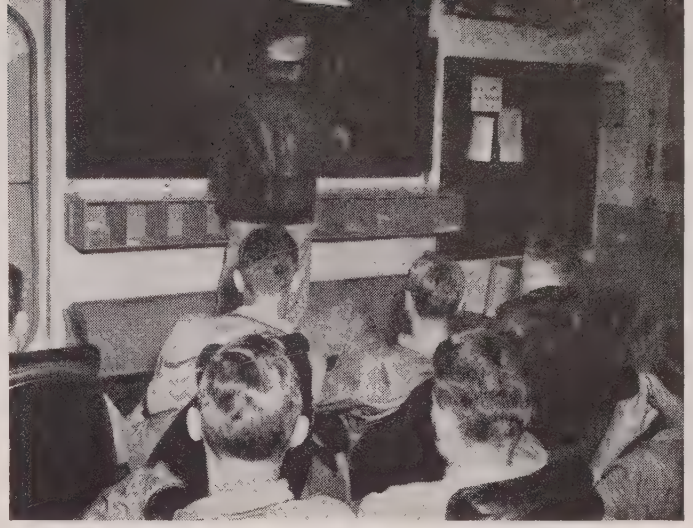
MISSILE developed by the Navy as a radio-controlled anti-shipping weapon is this twin-finned KU3N-1 (above). Modified PB4Y (below) carries both KDN-1 and KU3N-1 radio-controlled missiles in its bomb racks under the wings



Air Training Station, USN

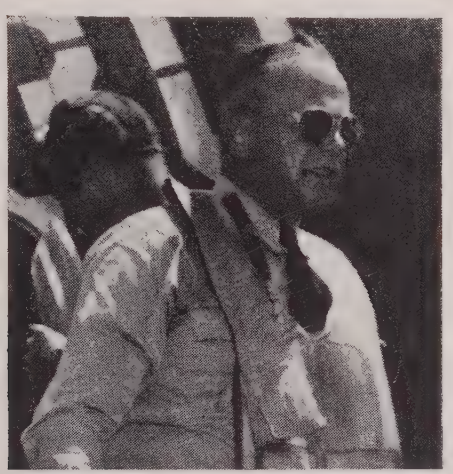
FLIGHT TRAINING for Air Navy begins in SNJ's, shown here in formation flight high above NAS at Pensacola. Pensacola is known as the Navy's Annapolis of the Air. Busy Corry Field (below) is just one of Air Station's fields

Adm. Reeves is the man behind the new Air Navy's training at Pensacola Base



HIGH POINT of Basic Training is first carrier deck landings. Here an instructor briefs Basic group in ready room

Down on the Gulf of Mexico, hard by the old Spanish fortress of San Carlos de Barrancas, lies the U.S. Naval Air Station of Pensacola, which has grown nearly as rich in naval tradition as Annapolis itself. Balmy Pensacola has been turning out naval aviators almost since the U.S. Navy acquired wings more than 35 years ago. Yet it is improbable that any Navy airman whose wings antedate the class of '41 would recognize old Pensacola today. And most of the 28,562 pilots who were trained at Pensacola during World War II would find that today's training program makes even their own high-pressure wartime experience seem comparatively mild.

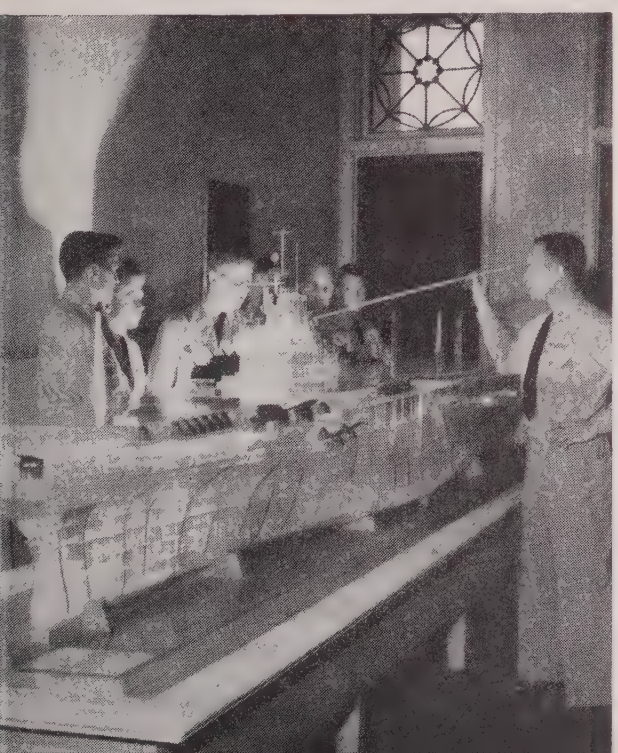


ADMIRAL J. W. Reeves, one of Navy's top pilots, is in command of Navy air training

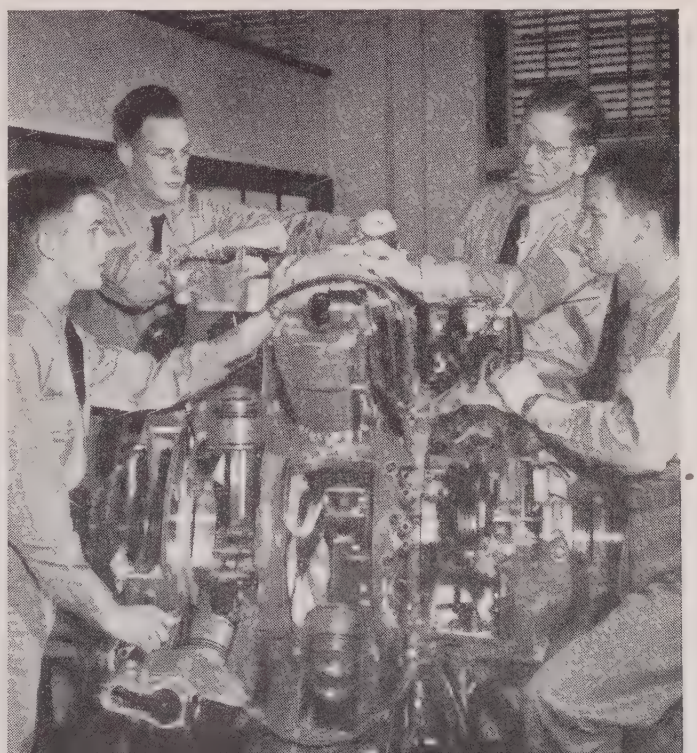
There are good reasons for this change. First, Pensacola, as headquarters of the Naval Air Training Command, is training men for the new Air Navy. This new Navy differs so radically from the old as to make any comparison a hopeless attempt to compare the incomparable. Secondly, there is Rear Admiral John Walter ("Black Jack") Reeves, who topped off a colorful record in carrier warfare in the Pacific by building the Naval Air Transport Service into

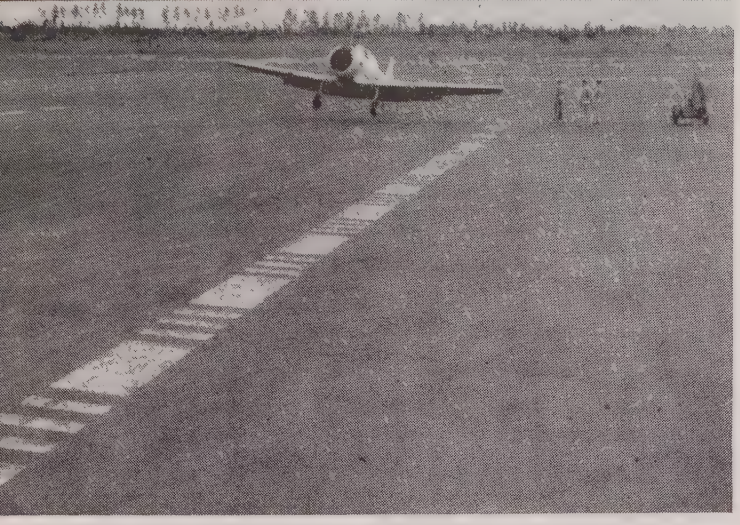
By JAMES MONAHAN

TRAINEES study design, construction of aircraft carriers, and learn the workings of these floating cities

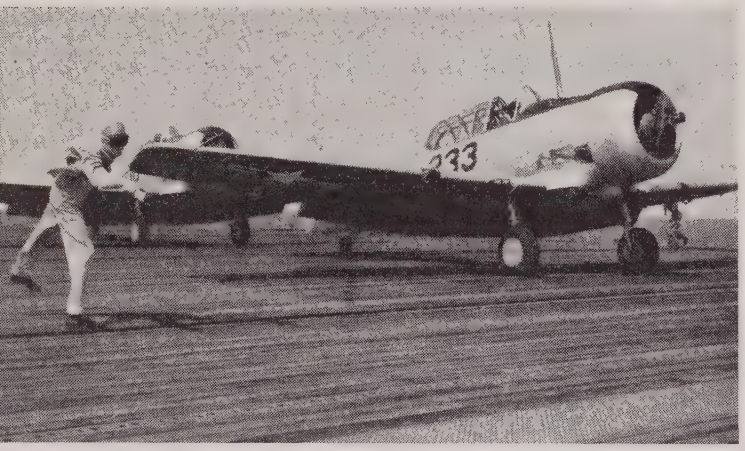


PILOTS not only learn how to fly but they are taught mechanics, maintenance of the engines they fly behind





PRE-CARRIER training includes take-offs and landings on field marked out to same size as flat-top's deck



FLIGHT Deck Officer gives a carrier trainee the go-head signal for his first take-off from the SS Wright

a tight and efficient organization that made air transport history.

Admiral Reeves took command of Naval air training in June 1948, and the transformation of Pensacola and its 25 subordinate training stations in the U.S. got under way. Today he runs a streamlined 20 million dollar per month business involving 50,000 men. The steady stream of business leaders from all parts of the country who come to Pensacola, by invitation, to inspect this mammoth operation with a critical taxpayer's eye are enormously impressed by Jack Reeves' cost-conscious way of doing business. He keeps a kind of bifocal vision riveted on the dual responsibilities of his job: to turn out a new type of highly skilled officer who is more than just a pilot, more than a traditional Navy man; and to turn out this complex product with unwavering regard for the last penny of each tax dollar allotted for the purpose. It has been said (both by airline operators who remember NATS, and by observers of the current training program) that Reeves not only can pinch a penny but make it give forth a very pleasant sound indeed.

At present the Naval Air Training Command has about 2,500 cadets, midshipmen, and student officers in various stages of their training to become Naval aviators. Of this number it is safe to say that 60 per cent will finish successfully and win their gold wings. The other 40 per cent, for one reason or another, will fail the high standards which allow for sending none but the best-fitted, best-trained men to the Fleet. Even this careful screening has not been tight enough to satisfy Reeves' exacting demands for quality of his product. Now each Naval aviator who is graduated to the Fleet is followed by an individual performance chart which comes back to NATC headquarters at intervals noting any deficiencies in performance or personality which might have been checked by training or screening. These records are applied weekly to the staff check-up on NATC curriculum and training methods.

Aside from graduates of the Naval Academy, all trainees have completed a minimum of two years of college work before coming to Pensacola. They first *(Continued on page 58)*

NAVAL AIR CADETS, taking advantage of career offered by the Navy, get a pre-flight briefing from Lieut. Hunt

FIRST SOLO calls for traditional ceremony of getting tie clipped. That's Mid'n Hitchcock getting the biz

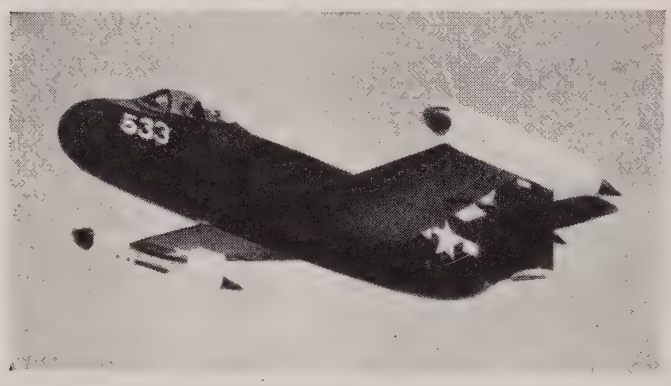
Planes of the Air Navy

As Chief of the Navy Bureau of Aeronautics, I am conscious of the speed with which, in these times, a war can start . . . jet-propulsion and long-range aircraft make past concepts of training time obsolete. Therefore, in order that no man can again impose his will on peace-loving peoples, the U. S. Navy must continue its strength during this period of uncertainty.

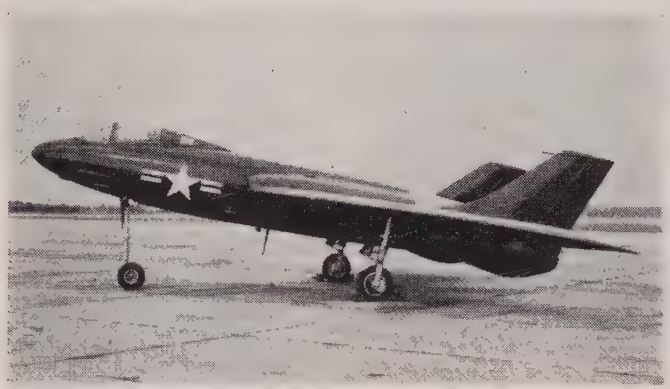
Adm. A. M. Pride USN

FIGHTERS

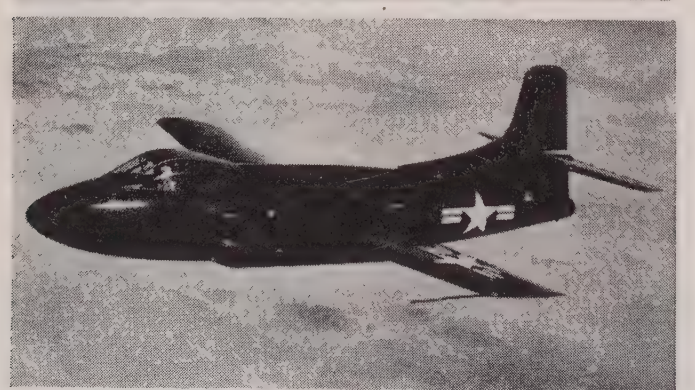
CHANCE VOUGHT F4U-5 *Corsairs* on order by Navy are the -5's, latest version of this World War II fighter. Powered by Pratt & Whitney 2,100-hp engine with two-stage supercharger, the F4U-5 has top speed over 450 mph and faster rate of climb than the -4. A single-seater, the F4U-5 is armed with four 20-mm cannon. Racks below wings hold eight rocket projectiles.



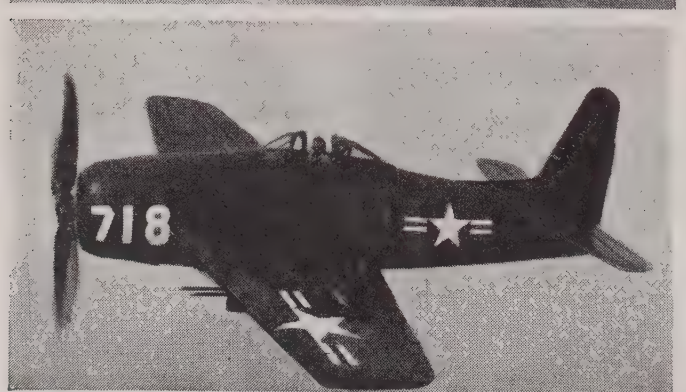
CHANCE VOUGHT XF6U-1 Called the *Pirate*, this is the first jet fighter built by Chance Vought for the Navy. Powered by Westinghouse 24C jet unit, plus Solar afterburner, the *Pirate* has a top speed of "well over 500 mph." Actually, the addition of the afterburner means an increase of 50 per cent in *Pirate's* speed at its best operating altitude. Built for carrier operations, the XF6U takes off from flight deck with the aid of catapult. The ship is 32 feet long; has 30-foot span.



CHANCE VOUGHT XF7U-1 Latest of Chance Vought-designed and built Navy fighters is this twin-jet swept-wing *Cutlass* which is presently undergoing extensive flight testing at the Naval Air Test Center, Patuxent, Maryland. Powered by a development of the J-34 (24C) Westinghouse jet unit and a Solar afterburner, the *Cutlass* is rated in the "over 600-mph class." Pilot sits about 10 feet above the ground (note photo) and forward of the ship's 35° swept-back wing.



DOUGLAS XF3D-1 Called the *Skyknight*, the XF3D is a twin-jet all-weather fighter designed for shipboard operations. Powered by two 24C Westinghouse turbojets, the *Skyknight* is reported to have a top speed of more than 500 mph. This speed is expected to be increased when modifications are completed on the 24C units. Carrying two in side-by-side arrangement, the *Skyknight* can be used as both fighter, bomber on long-range missions. Equipment includes radar, 20-mm cannon.



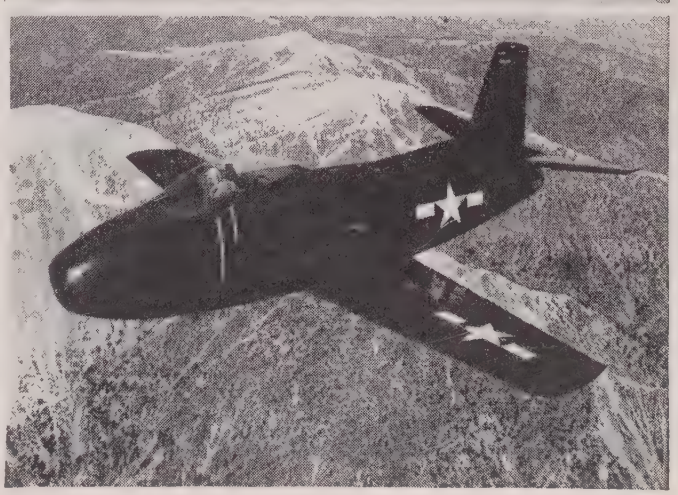
GRUMMAN F8F-2 Still a feature of the Air Navy's fighting force, the *Bearcat* in use today is powered by Pratt & Whitney 2,250-hp (take-off rating) engine which increases the ship's operations at high altitudes. Armament consists of four 20-mm cannon or new 15.2-mm machine guns. Difference between the F8F-1 and F8F-2, beside powerplant, is increased fin and rudder area in the F8F-2. The ship has top speed of 455 mph.

GRUMMAN F9F-3 Another jet fighter designed for carrier operations is the *Panther.* Half of the *Panthers* coming off Grumman production lines will be powered by Pratt & Whitney-built Rolls-Royce *Nene;* the other half will be powered by Allison J-33 jet engines. While details of performance are not available, the speed of the *Panther* is listed "in the 600-mph class." Built for high-altitude work, the *Panther's* cockpit is pressurized. Canopy of the F9F is quick-release type; pilot-ejection seat is used. Leading-edge flaps on ship provide good control at slow speed.

McDONNELL FH-1 Known as the *Phantom,* the FH-1 is today in operational service with the fleet. The Navy designated the FH-1 as an interim fighter type to be used for training pilots and plane handlers in jet operations so they would be ready for the new F2H and the F9F-3 when both of them become operational. Powered by two Westinghouse J-30 jet units, the *Phantom* has a top speed of more than 500 mph and a rate of climb of 5,000 feet per minute. Outer wing panels of the FH-1 fold upward to facilitate storage aboard Navy's carriers. Armament of *Phantom* includes four 50-cal machine guns.

McDONNELL F2H-1 More powerful than its predecessor—the FH-1, the *Banshee* has been designated to share fighter-plane honors with the Grumman *Panther.* Powered by two 24C Westinghouse turbojet units, the *Banshee* is in the "over-600-mph class." Its rate of climb is a phenomenal 9,000 feet per minute. Service ceiling of the *Banshee* is 48,000 feet and its range is 1,200 miles. The single-seater F2H provides "extra safety" in that it will cruise on either jet engine alone. The *Banshee* employs a "kneeling" mechanism similar to the North American FJ-1. Armament information is still "classified."

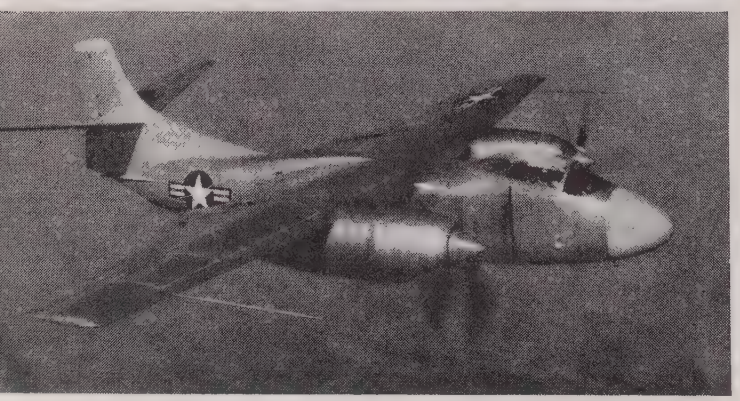
NORTH AMERICAN FJ-1 The fighting *Fury,* a single-jet ship designed for shipboard operations, was one of first jet fighters to go into fleet operations. Powered by J-35 General Electric turbojet, the FJ-1 has a top speed listed in the usual "600-mph class." Design of the plane permits fuel cells inside the fuselage instead of in the wings. The *Fury* has a tricycle landing gear and is equipped with a "kneeling" mechanism which makes it possible to rest the nose section on a special dolly to provide better storage on crowded carrier decks. The wings of the *Fury* do not fold back as do other shipboard fighters.



ATTACK PLANES

DOUGLAS AD-2 One of the fastest attack planes in the service, the AD-2 is powered by new Wright R-3350-26W engine which gives it greater speed than its 350-mph predecessor, the AD-1. Its range is also increased over the AD-1. The new AD-2 carries bombs as well as rockets and torpedoes. Large fuselage dive brakes, aft of the wing trailing edge, steady the plane and control its dive speed in a run on a surface target. At the present time, the AD-1 and AD-2 are now operating with the fleet; AD-3's and AD-4's are on Douglas' production line. In all, there have been 18 separate versions of Navy's AD's.

MARTIN AM-1 One of the largest planes ever built for aircraft-carrier operations, the Navy's *Mauler* is powered by "over 3,000-hp" Pratt & Whitney engine which gives it a top speed of 350 mph and a cruising speed of "over 280 mph." It has range of 1,150 miles. Armed with four 20-mm-cannon, the *Mauler* also carries torpedoes, rockets or heavy bombs. It has no internal bomb bay, all bombs, etc., being carried under each wing. The ship is used as either an attack or dive bomber. It will withstand dives of over 500 mph.



NORTH AMERICAN XAJ-1 Designed as a ship-board bomber, the XAJ-1 represents a new type of aircraft for the Navy. Powered by two Pratt & Whitney 2,400-hp (with water injection) engines in nacelles under the high wing, and one GE-Allison TG-180 turbojet located inside tail section of the ship, the XAJ-1 is reported to have a top speed of "around 450-mph." The bomber carries a crew of three in its pressurized cockpit. Under combat conditions, the XAJ-1's jet unit can be cut in for spurts of extra speed when needed. The outer wing panels fold in-board.

ATROL PLANES

CKHEED P2V-2 The twin-engine long-range rol bomber, *Neptune,* is a familiar Navy air- ne. Powered by two 2,500-hp Wright engines, P2V has a top speed of 300 mph. Cruising, h full load, is 146 mph and range, 3,500 miles. ipped with jet-assist (JATO) units, the P2V k off from deck of a carrier recently. Groomed n anti-sub patrol plane, the *Neptune* carries non and machine guns, rockets, torpedoes.

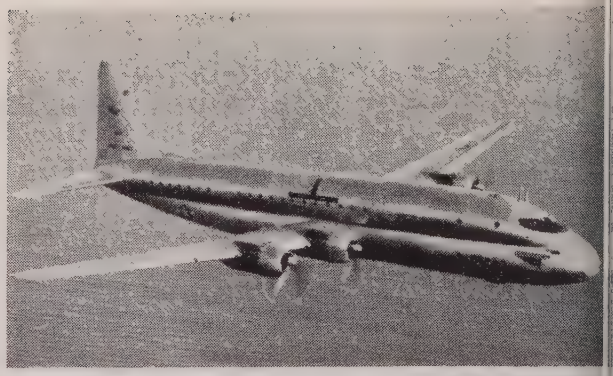
RTIN P4M-1 Called the *Mercator,* the P4M-1 land-based patrol plane powered by two 0-hp Pratt & Whitney engines mounted in elles with two Allison J-33 jet units. These the *Mercator* a top speed in the "over 350- n class." It was designed, however, to cruise e than 3,000 miles at a speed of around 200 n. The jet units are brought into use for short -off or where extra speed in combat is need- The plane carries a crew of nine and is equip- with the latest radar, radio and other elec- ic devices for recon missions. It is well armed.

RTIN PBM-5A Latest of the *Mariners* is this M-5A patrol bomber. Designed for long-range ols and air-sea rescue missions, the PBM is ered by two 2,100-hp Pratt & Whitney en- s. With a useful load of about 20,000 pounds, range of the *Mariner* is more than 2,000 s; its top speed is about 180 mph and it ises at 150 mph. The ship carries a crew of and has service ceiling of better than 15,000 . JATO units are standard installations on *Mariner* and they enable the heavily loaded M to get off ground or water for long-range ol missions. The Navy has 36 ships on order.

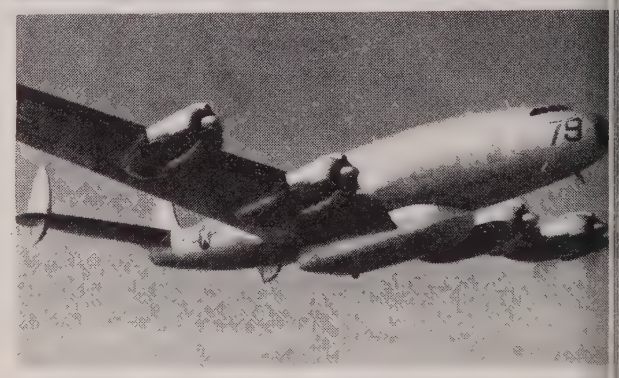
RTIN XP5M-1 In the flying-boat category, XP5M is one of the newest for the Navy. A n-engine patrol boat, the XP5M is powered two 2,700-hp Wright engines which give the ng boat a speed (maximum) of more than mph. Eventually this ship is expected to e greater range than any other flying boat in class. Employing a new type of hull, the M's performance is better than other flying ts. The long afterbody hull permits safer dings in rough seas without excessive pitch- The XP5M carries a crew of 11. Optional de- feature is the provision for droppable spon- tanks for more fuel, thereby greater range.

TRANSPORTS

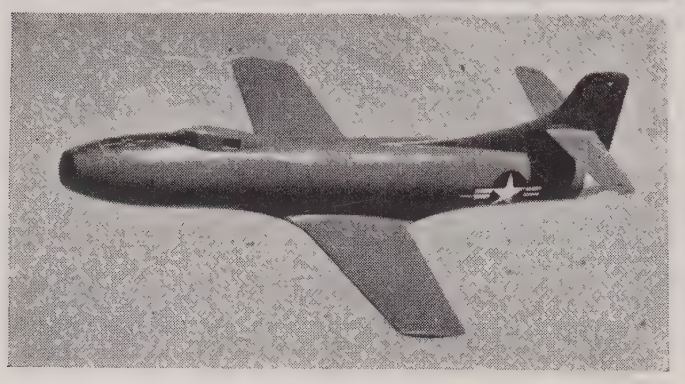
LOCKHEED R-60 The *Constitution* is one of the world's largest commercial-type planes. Powered by four Pratt & Whitney 3,500-hp engines, the R-60 has cruising speed of 269 mph at 20,000 feet. It has service ceiling of 27,600 feet, and range of 6,300 miles. It has two decks, the top one carrying 92 passengers, lower one, 76; has crew of 12. Engines can be serviced in flight.



LOCKHEED PO-1W The Navy has on its roster a Navy version of the commercial *Constellation.* The one shown in the picture carries a "Speed-pak," an all-metal pannier for carrying additional cargo. With this attached to the belly of the ship, it reduces the *Connie's* speed by 12 mph. Powered by four Wright *Cyclone* engines, the Navy's *Constellation* cruises at 328 mph and has normal range of 3,000 miles with a full load. It is intended as radar-equipment carrying transport.



MARTIN JRM-2 Called the *Mars,* the JRM-2 has same over-all dimensions of the JRM-1, but the 2 grosses 165,000 pounds to the 1's 145,000 pounds. Powered by four 3,000-hp Pratt & Whitney engines, the JRM-2 cruises at 173 mph and has range of 6,750 miles. Useful load of the JRM-2 is 83,739 pounds. The Navy states the JRM-2 can carry 38,000 pounds of cargo from California to Hawaii. It was JRM-2 that last year flew non-stop from Honolulu to Chicago.



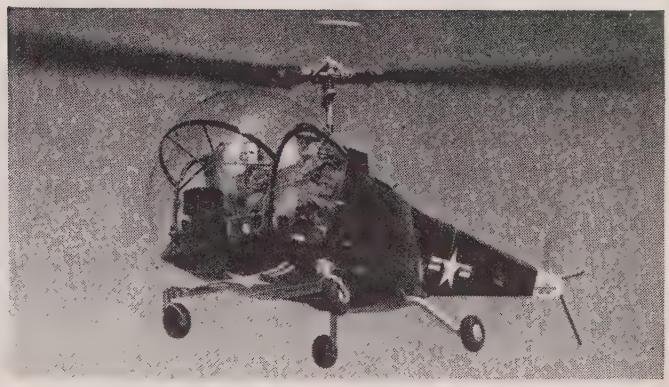
RESEARCH

DOUGLAS D-558-2 Designed in cooperation with NACA and the Navy, the *Skyrocket* was developed for exploration of high speeds and high altitudes. Constructed of aluminum and magnesium alloy, the D-558-2 is powered by Westinghouse 24C jet engine and Reaction Motors rockets. Wing sweep-back of the *Skyrocket* is 35° and the tailplane sweep-back is 40°. The pilot's compartment is jettisonable in flight.

DOUGLAS D-558 Forerunner to the *Skyrocket* was the *Skystreak,* also developed by NACA and the Navy in cooperation with Douglas. Powered by jet TG-180, the *Skystreak* has a maximum speed of 650 mph, according to official data. However, the research ship has been flown at a speed of 680 mph. As in the *Skyrocket,* the pilot's compartment is jettisonable in case of emergency.

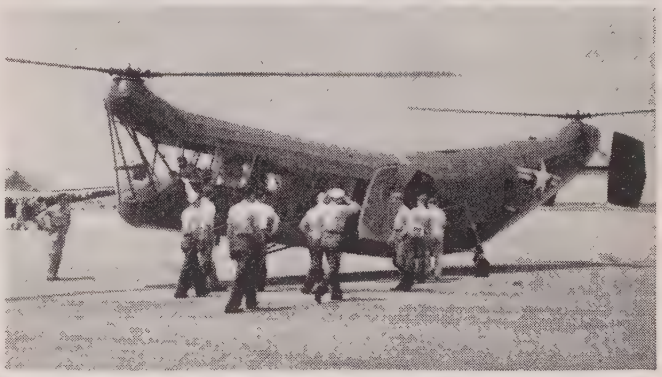
HELICOPTERS

BELL HTL-2 Used as a primary trainer and also as special mission 'copter the HTL-2 is a single-engine (Franklin 178-hp) two-place side-by-side helicopter with a cruising speed of 80 mph and a normal range of 200 miles. It has a hovering ceiling without ground effect of 2,000 feet, and an absolute ceiling of 11,000 feet. Navy has 22 of these helicoptors in use at the present time.



McDONNELL XHJD-1 The Navy's first twin-engine helicopter, the XHJD-1 is powered by two 450-hp Pratt & Whitney engines which give the 'copter a cruising speed of more than 100 mph. The engines are mounted in "barrel" nacelles. It has a useful load of over 3,000 pounds. At the present time the XHJD-1 is being used extensively in a program of flight research. Feature of this 'copter is that it will fly on either of its two engines. Rotors are arranged side by side.

PIASECKI HRP-1 Called by many the "Flying Banana," the HRP-1 *Rescuer* is powered by a 600-hp Pratt & Whitney which drives its two tandem rotors. The engine is housed just aft of the rear landing gear. It was designed to carry a crew of two, plus eight passengers. In the transport helicopter class, tests are presently being run to judge its usefulness as Marine troop transport. An all-metal version of HRP-1 will be HRP-2. Another new 'copter is Piasecki's XHJP-1.

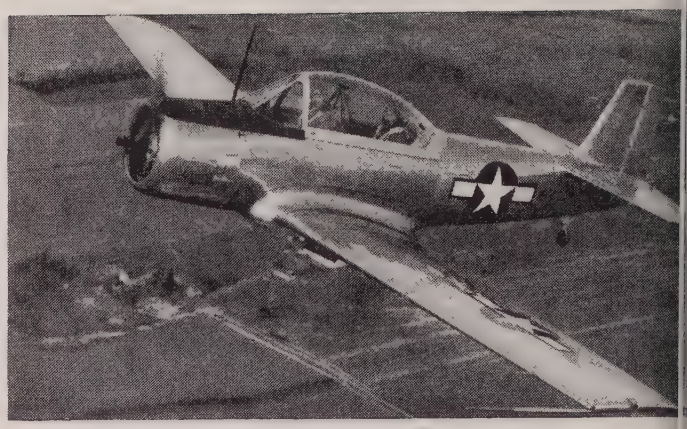


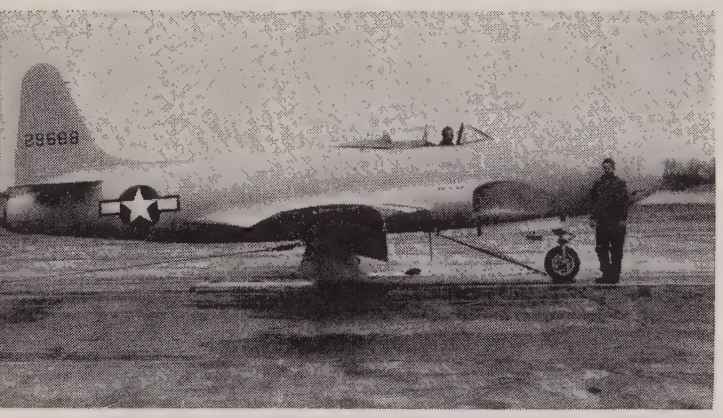
SIKORSKY XHJS-1 Still in the process of undergoing evaluation tests, the XHJS-1 is a 'copter designed for utility, rescue, inter-communication and observation work aboard Navy battleships, cruisers. Powered by 500-hp Continental engine, XHJS-1 carries a normal crew of three, but five persons can be carried. For ship-board stowage the rotor blades may be folded and locked aft to a tail cone. The XHJS-1 cruises at about 100 mph, and it has range of 330 miles.

SIKORSKY HO3S-1 A version of the commercial S-51, this helicopter has been procured by the Navy primarily for utility work. It carries pilot and three passengers. Powered by 450-hp Pratt & Whitney engine, the HO3S-1 has cruising speed of about 85 mph, range of 260 miles. It has hovering ceiling of 5,100 feet. Several of the HO3S-1's are equipped with rescue hoists, and auxiliary fuel tank for increasing its rescue range.

TRAINERS

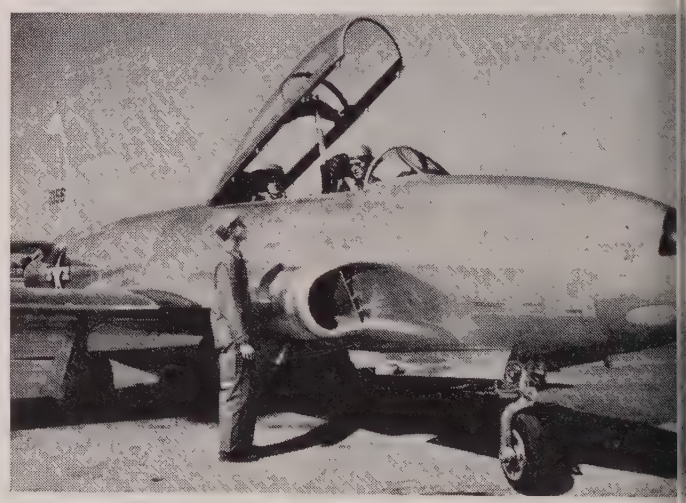
FAIRCHILD XNQ Called a "specialist" plane, the XNQ is a conventional two-place low-wing trainer designed for use by both the Navy and the Air Force. Powered by 280-hp Lycoming engine, the XNQ has top speed of 174 mph and a cruising speed of 148 mph. Feature of this trainer is its functional cockpit. Instruments, controls and switches are grouped according to importance, and landing gear, flaps, etc., have knobs suggestive of use, *i.e.* miniature wheel (for gear).





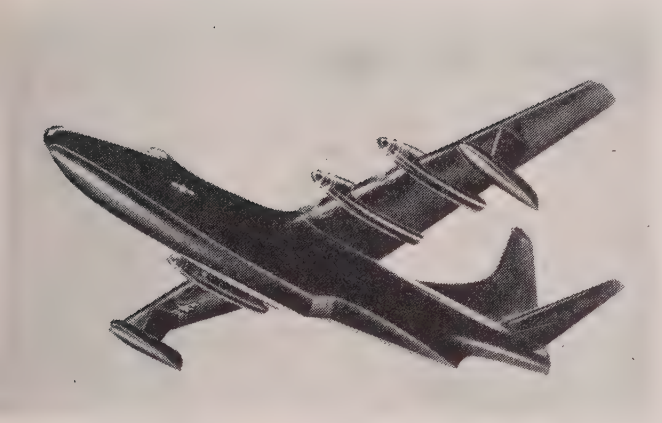
LOCKHEED TO-1 A few Navy versions of the F-80B were purchased for transitional training of jet pilots. The TO-1, as the Navy designates the F-80, does not have an arrester gear and is not used on carriers. It is, however, used at training stations for catapult instruction. A single-seater, the TO-1 is powered by an Allison J-33 jet engine which gives it a top speed of 558 mph at sea level (508 mph at 30,000 feet) and maximum ferry range of 1,100 miles. Camera equipment can be placed in the nose section of the TO-1.

LOCKHEED TO-2 This is the Navy's version of the USAF'S TF-80C. A two-place jet plane, it is used as a jet trainer by the Navy in readying its pilots for shipboard jet-plane operations. Powered by Allison J-33 engine, it has top speed similar to that of the TO-1. The fuselage of the TO-2 is 38 inches longer than that of the TO-1, and single canopy covers both cockpits. The instructor sits in the rear cockpit. Armament consists of two machine guns. TO-2 has a larger capacity air conditioning and refrigerating system.



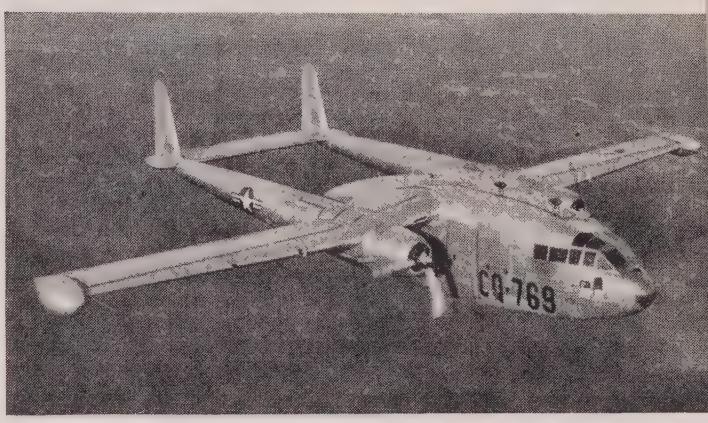
NORTH AMERICAN XSN2J-1 An intermediate trainer developed for the Navy, the XSN2J-1 is primarily for carrier training. It is also suitable, however, for dual instruction in fighter tactics, dive bombing, instrument flying, navigational training, etc. Powered by 1,100-hp Wright engine, the XSN2J-1 has a top speed of 270 mph and an initial rate of climb of 2,000 feet per minute. A power-operated "bubble" canopy covers the tandem cockpits. Both cockpits conform to standardized "functional" cockpit designed jointly by USAF, Navy and the RAF. Instructor can "upset" controls and instruments to simulate emergencies.

MISCELLANEOUS



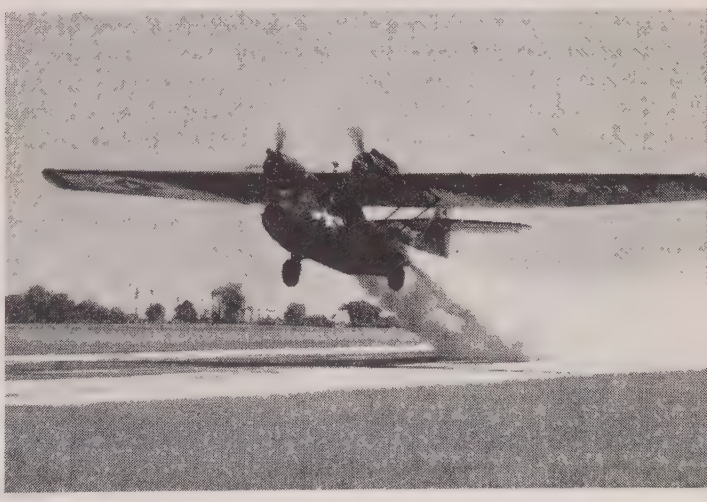
CONSOLIDATED XP5Y-1 Still very much in the "building" stages is the experimental long-range high-performance flying boat designated XP5Y-1. Power plant is said to consist of four 5,500-hp Allison T-40 propjet units, each engine being two TG-180's paired and geared to drive a common prop. Reported to be about the largest flying boat ever built by Convair, the Navy XP5Y-1 is designed for day and night search-and-rescue operations and anti-submarine patrol work.

FAIRCHILD R4Q The Navy has eight Fairchild transports on order. Designated R4Q, the plane is powered by two 2,650-hp (rated at 6,000 feet) Pratt & Whitney engines which give it a cruising speed of 230 mph. An ambulance version of the R4Q will accommodate 38 litters and four attendants. The ship carries a crew of four: pilot, copilot, navigator and radio operator. Design gross weight of the R4Q is approximately 64,000 pounds with a payload of 24,000 pounds for 1,500 miles. Ship stalls at 92 mph with flaps.



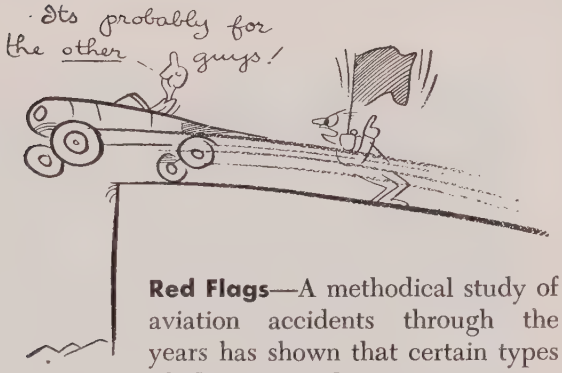
GRUMMAN JR2F-1 Called the *Albatross,* this twin-engine amphibian has been ordered by the Navy for all-around utilitarian use. Especially built for rough-water operations, the JR2F-1 can be used as a multi-engine pilot trainer or as a sea-rescue plane. Powered by two 1,425-hp Wright engines, the *Albatross* has a top speed of 270 mph, a cruising speed of 225 mph and a range (fully loaded) of 600 miles, or as a cargo transport, 1,400 miles. Actually the *Albatross* is a scaled-up higher-powered version of the *Mallard.*

CONSOLIDATED VULTEE PBY-5A Although no longer in production, several PBY'S are still in use by the Navy. This one pictured here is equipped with JATO units for jump take-offs. The famed *Catalina,* a twin-engined patrol bomber, served as a sub-chaser during World War II as well as an air-sea search and rescue plane. Many were flown by Coast Guard pilots. Powered by Pratt & Whitney 2,400-hp engines, the "*Cat*" has a top speed of 196 mph and a range of over 3,000 miles. It carries a crew of seven or eight men. Today, several *Catalina's* are being used by flyers of the Naval Air Reserve Program.



DILBERT

By Seth Warner and Robert C. Osborn

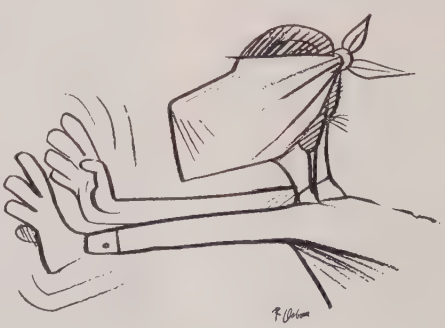


Red Flags—A methodical study of aviation accidents through the years has shown that certain types of flying are dangerous. For instance, it has been found from cold (very cold) statistics, that student pilots have insufficient training and experience to carry passengers safely. The Civil Aeronautics Board has posted a "red flag" at this spot by prohibiting such flying.

Similarly, many other danger areas have been posted with "red flags"; the minimum safe altitude over populated areas, what weather to avoid, approach and landing procedures, and what constitutes airworthiness as regards the design, manufacture and condition of airplanes. All these and many others mark danger spots which have been located the hard way. They mark the limitations of personnel and material, as the result of millions of hours of flying experience.

Stay away from these "red flags," not because an inspector might see you and penalize you, but because common sense tells you it isn't worth while. There are too many other ways of getting a thrill in aviation.

As a matter of fact, the Civil Aeronautics Board has been very restrained in issuing new safety orders, and has kept them to a bare minimum. Many states and municipalities consider them inadequate and have started tightening up by issuing additional laws and regulations of their own. Every time you thoughtlessly endanger the local citizens you increase the pressure for more of the same. The annoying part of this is that it is usually a very small percentage of pilots who cause all this hullabaloo for stricter regulations.



A Dirty Trick—Dilbert was out enjoying the spring sunshine in a small two-place trainer. Ah, it was good just to be alive!

He was so intent on sopping up this lovely atmosphere that he may have become a bit careless about the business at hand. His communion with nature was rudely shattered when he accidently noted that he was almost out of gas. Instantly, his steel-trap mind snapped into action.

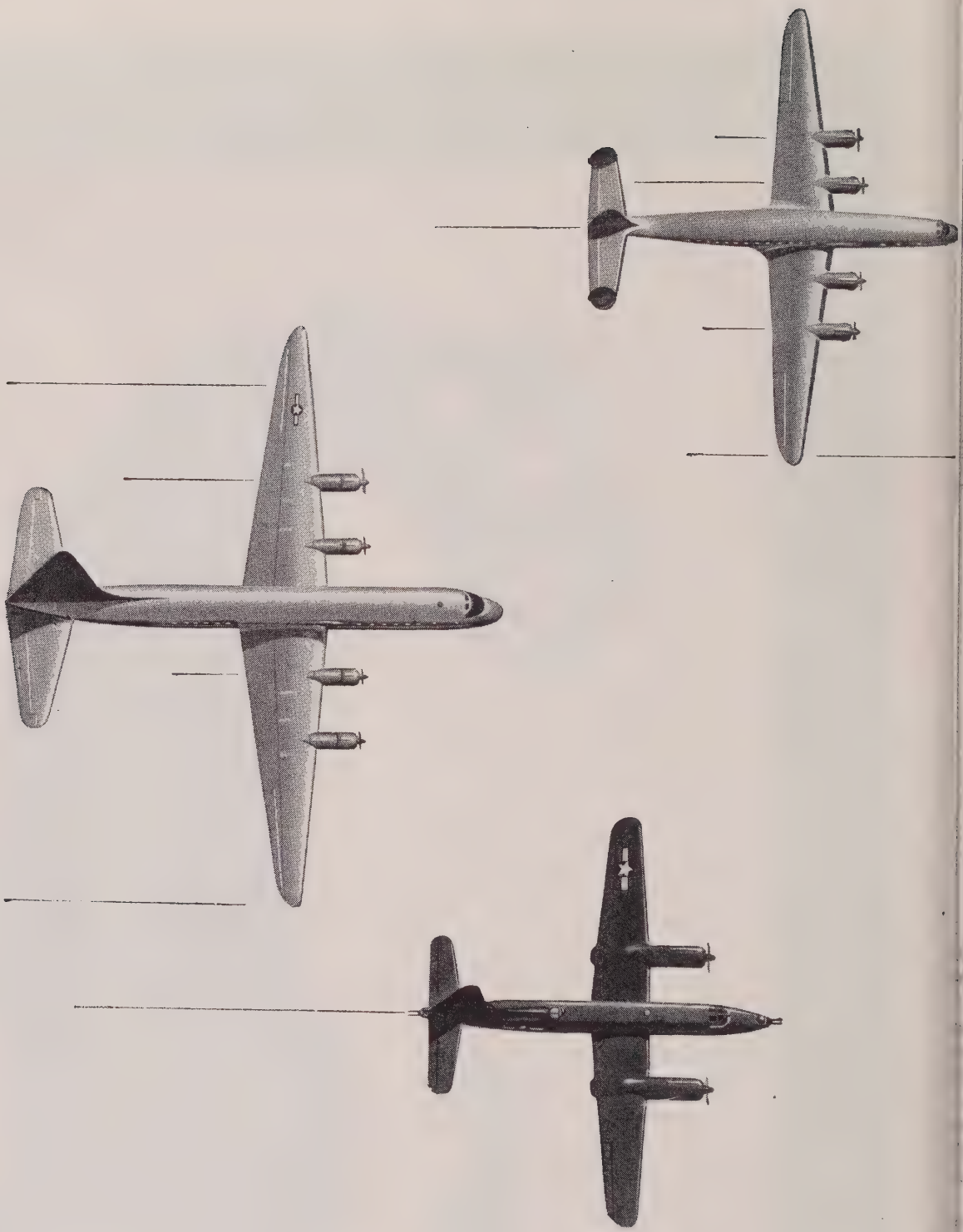
Not a chance to reach home! No nearby emergency field! Heavy recent rains—every pasture a bog! Deserted three-lane highway right ahead! A bit crosswind, but a swell landing strip! Thus, less than 30 seconds after this self-imposed emergency arose, our hero was in his landing approach.

It wasn't until he broke his glide that he found his vision was impaired by a dirty windshield. He couldn't see exactly what he was doing. But he couldn't risk another pass, so he set her down anyway. Of course, the plane came to rest, wheels in the air, in the ditch.

Needless to say, this wasn't exactly the way Dilbert told the story. He never said a word about his dirty windshield because he couldn't alibi having wiped it with an oily rag just before take-off.

Some people don't even learn by experience. Dilbert had been embarrassed by a dirty windshield before. One day *(Continued on page 62)*

"Only a Dilbert thinks he can fly when he's hangover-haunted!"



All the Leaders are Lockheeds

Digest Nose-Diving Navy?

(Continued from page 15)

peppered with invective against "battleship admirals" and "Maginot-minded generals." Laughing at these retired old war horses is like snickering at the good frigate *Constitution* because it didn't have a steam turbine. At least the military has-beens have had the decency to retire while the pocket-sized magazine experts are still around trying to ridicule 1932 thinking to make 1942 guesses look like 1952 facts.

The applesauce is spiced with clairvoyance and military "secrets" to make the sour dose palatable. As to the validity of this prophesying let's look at just one statement by one of these experts and see how cloudy his crystal ball really is. Major Seversky has said ever since 1942, *"Misgivings have been expressed about the ability of huge planes to survive against short-range defensive aviation. They are unjustified. In general the bigger the plane . . . the greater the number and caliber of guns, etc. . . ."* ("Victory Through Air Power," 1942).

Obviously, Seversky did not know then, and if he knows now he has kept quiet about the fact, that this statement is diametrically opposite to the truth. The small fighter plane has all the advantages of greater caliber and range of firepower in its rockets, as well as other obvious advantages which we will take up later.

A comparison of rockets in a fighter against the cannons and machine guns of a bomber gives the deciding "edge" to the rockets. Only a fighter plane can shoot rockets. They can only be fired into the wind in line with the flight of the plane which fires them. If a bomber attempted to fire them broadside, as it must against a smart attacker, the rockets would weathercock in the slipstream and point toward bomber's nose rather than at the attacker.

Anyone who survived the bomb runs over Europe before the protection of fighter escort will take the rest of Seversky's statement apart for you *if* he doesn't take you apart first for quoting it.

We give you only one of his predictions of things that never came true because we do not want to smear the side of the argument the Digest is presenting. We are merely pleading for a chance to have all sides presented fairly.

That's why we object to the Reader's Digest apples—they're lopsided. They show only one bulging side to disguise the fact that there's less than half an apple . . . the worms of bias have eaten out most of the back. They'd have you believe that the AF's third of apple will keep the enemy away, so why buy a whole apple for defense?

The only excuse they offer for this biased view is the claim that the Air Forces are gagged and must have a champion. Huie makes the statement that the other services can talk freely. It is no secret that the Army and Navy have gagged themselves, too, to keep peace in the family. And Air Forces General Vandenberg, himself, discounted the need for a self-appointed champion when he stated, *"The three services are in complete agreement that no one service can do the job alone."*

The Chief of Staff spoke out against those who would foment possible friction into a fratricidal war. General Bradley, on February 4, 1949, answered the Digest's lopsided views with, *"Security is a cooperative venture; it is not a competitive race."* (Statement made at *3rd Nat'l Industry Army Day Conference,* at Boston, Mass.)

As far back as March, 1938, the Digest struck the Napoleonic pose of a military strategist. In "Our Hawaiian Gibraltar," by Don Wharton, it told why Pearl Harbor was impregnable. Here is a passage, *"No enemy would think of taking (Pearl Harbor) . . . with less than 100,000 men."*

Maybe many of us felt secure in that thought back in 1938! One hundred thousand men did not storm the fortress, but look what a few carrier-based Jap planes did! And here is an even more interesting quote—it is the beginning of the campaign to discount the value of the aircraft carrier: *"To prevent the enemy from reducing the long-range batteries with planes, we would probably use our air forces to destroy his aircraft carriers . . ."* How many of "his" carriers were sunk on Dec. 7, 1941?

Despite the fact that during World War II, Naval aviators destroyed 12,268 enemy planes in air combat and lost only 879 in return, and ignoring the implications of the fact that 93 per cent of the enemy planes destroyed by our carrier-based planes were land-based, the Reader's Digest has continued its attempt to sink the Air Navy.

Another Digest fable concerns the vulnerability of the aircraft carrier. To sink these ships with words, after 141 *Kamikazes* attacks failed, the Digest found the author of, *"Recent war experience has left no doubt that aircraft carriers are the most vulnerable part of the fleet."*—("Victory Through Air Power," by Seversky.)

No doubt, huh! From the time Seversky lambasted carriers in the New York *Times* toward the end of the Guadalcanal campaign, no major carrier was lost. In fact, of the *Essex* class, the fast-type carrier that bore the brunt of all fighting in the Pacific, *not one* was sunk during the war!

The anti-Navy boys have made much of the sinking of "baby flat-tops" and ships which were originally built for other purposes (such as the *Lexington*) but they forget that the *Franklin* survived the enemy's best Sunday punch. This carrier was hit by the ultimate in guided missiles—Jap *Kamikaze* planes controlled by fanatical humans dedicated to destruction.

After the gallant *Franklin* took all the enemy had to give and while she helped her sisters shoot down *every* single Jap, she suffered the greatest blow of all—an extremely lucky Jap hit set off her bombs, rockets, and some of her high-test gasoline. Her own terrific firepower turned against her. She ripped her insides out from stem to stern. But she survived. She steamed home (under her own power) from Okinawa to the East Coast of the United States. There she received the unkindest cut of all from the pulp-paper generals—they dared to dub her breed, "vulnerable."

Seversky in his forthcoming book "Peace Through Air Power" (a condensed version in Reader's Digest, February, 1949) ignores the record of the Navy's big carriers in World War II, and states: *"The 80,000-ton floating islands on which our Navy has set its hopes are military monstrosities. They will be quarter-of-a-billion dollar*

(Continued on page 50)

CAOA REPORT . . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

Successful Meeting With Port Authority . . .

Since this last report appeared, the CAOA has met with the Port of New York Authority to present to its officials the suggestions from Association members as to how better airports under its jurisdiction might cooperate wi'h operators of executive aircraft.

The meeting was highly successful and should mark a new milestone in airport management—executive aircraft operator cooperation. Present at the meeting and representing the Authority were James C. Buckley, Director of Airport Development; Wm. M. Schwarz, Chief, Air Carrier Bureau; Alex L. Hart, Chief Airport Planning Bureau; A. N. Wiley and Norman Johnson, Senior Airport Analysts; and Harvey F. Law, General Supt. of Airports. The discussions were carried on informally with your Secretary.

The Authority was greatly interested in the suggestions from CAOA members for here, they felt, were concrete reports from those vitally interested in and effected by conditions at local air terminals. These suggestions were presented in the form of actual extracts from the many letters received.

The results of the meeting should be far-reaching and of great benefit to all executive aircraft operators. Many of the points under discussion will be rectified in the near future for better service to itinerant corporation aircraft. On the other hand it was pointed out that certain services are already available at New York area air terminals but unused by visiting aircraft for lack of knowledge of their availability.

To overcome this situation the Authority is now publishing an Airport Users Bulletin every month. This attractive and informative publication is available to users of any of the airports under the jurisdiction of the Authority; La Guardia, New York International Airport, and Newark. It is also available to others who are interested in using these terminals. Contact Lou Phillips, Reports Editor, 111 Eighth Ave., New York 11, New York, or James C. Buckley of the same address.

Further meetings between your Association and the Authority are scheduled to assure continued cooperation in making New York area air terminals good hosts to CAOA members.

Another Invitation to CAOA . . .

More and more airport operators are recognizing the importance of CAOA and the operators of executive aircraft. It is a good investment to be a genial airport host to such itinerant aircraft for they are usually highly responsible visitors, primarily business men, quick to recognize good business practices and efficient service.

American Airmotive, at Miami International Airport, Florida, for example, typifies this attitude. Henry H. Richardson, of Amairco, as it is known, extends a hearty invitation to all CAOA members with the assurance of "every possible courtesy and convenience . . . regardless of whether maintenance may be required, if only because we have often arrived at a strange field ourselves, and have been confronted with the too casual apathetic attitude of the airport personnel."

Our thanks to Mr. Richardson for such a cordial invitation and may other airport operators please note.

Weather Station Map Now Available . . .

The problem of locating the nearest weather reporting station of the U. S. Weather Bureau has been solved. A new map giving such data has been made available by that branch of the government.

This map gives locations and types of airways, synoptic, and supplemental weather reporting stations operated by the CAA, the Weather Bureau, Air Force, Navy, Coast Guard and other agencies.

The map also includes data on international, city, and airway forecast centers, flight advisory service units, Weather Bureau regional headquarters, airport stations, and city offices. It makes no difference whether or not the stations are on or off the Civil Airways.

Those interested may obtain the map by number (1806) from the U. S. Weather Bureau, Washington 25, D. C. It is three feet by two feet in size and will be an invaluable map for any operations room. Mention CAOA membership when writing.

Third Dimensional Charts . . .

Much is to be desired of most air navigation charts. Much will be impossible to include for many reasons, but from time to time new charts appear with a little more detail and information for the aid of the user. Such is the new type of charts introduced by Frances Burr, of New York City.

Miss Burr's charts have gone the usual air navigation charts one better at least and perhaps two. Airbrushed over the usual data are vertical impressions of mountains and elevations giving a sort of third-dimension quality to the map. These new maps enable the pilot to readily identify landmarks, pick routes avoiding ridges and peaks where down drafts might be encountered and generally "spot" his location in reference to terrain details below him.

The Burr Three-Dimensional Charts are now under consideration by the government and it is hoped that they will eventually be available to all pilots. At first they will be limited to areas about airports where terrain presents unusual hazards such as the Salt Lake City Airport No. 1, Salt Lake City, Utah, and then eventually perhaps the entire country.

Many high government officials as well as veteran pilots have expressed interest and approval of these unique new air navigation charts. Additional information may be obtained by addressing Miss Frances Burr, 49 West 44th St., New York City, New York.

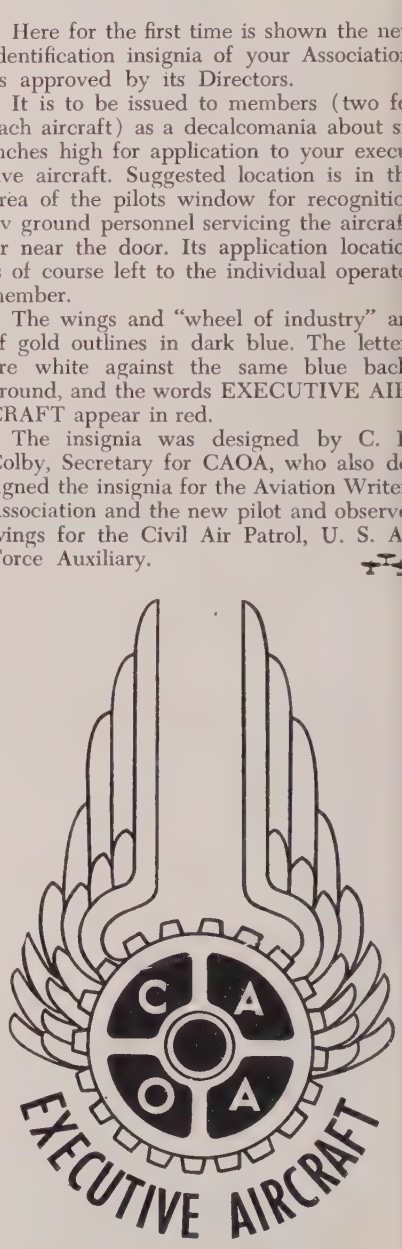
New CAOA Insignia . . .

Here for the first time is shown the new identification insignia of your Association, as approved by its Directors.

It is to be issued to members (two for each aircraft) as a decalcomania about six inches high for application to your executive aircraft. Suggested location is in the area of the pilots window for recognition by ground personnel servicing the aircraft, or near the door. Its application location is of course left to the individual operator member.

The wings and "wheel of industry" are of gold outlines in dark blue. The letters are white against the same blue background, and the words EXECUTIVE AIRCRAFT appear in red.

The insignia was designed by C. B. Colby, Secretary for CAOA, who also designed the insignia for the Aviation Writers Association and the new pilot and observer wings for the Civil Air Patrol, U. S. Air Force Auxiliary.



PLANE FAX

A page of service tips for private flyers and fixed-base operators

Avoid engine failure during take-off

Proper warm-up is a "must" for safe take-off. Don't take chances on a cold engine that doesn't "rev up" on the ground. Engines warm up faster with Chevron Aviation Gasoline without vapor-lock. That's because this premium-quality fuel is scientifically blended with just the right amount of light fractions for extra power and peak performance under all conditions.

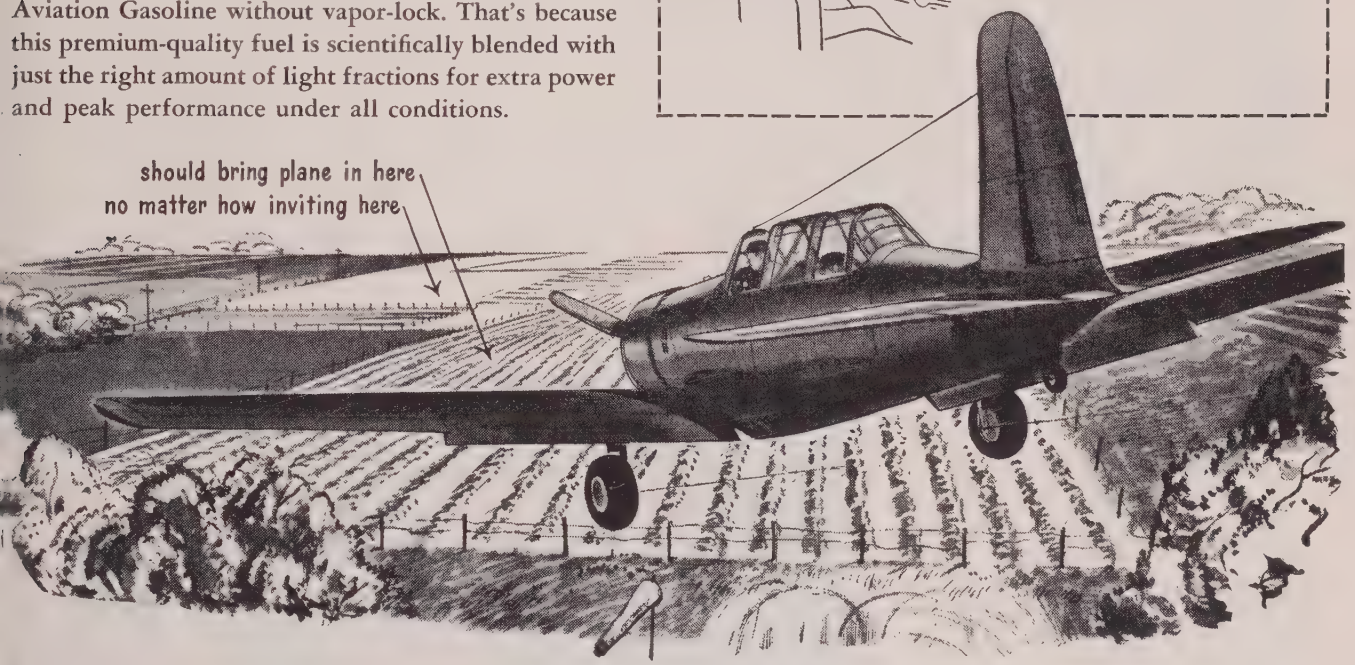
Four quick do's and don'ts in case your engine conks out during take-off.

① Pick a spot—fast—for a forced landing

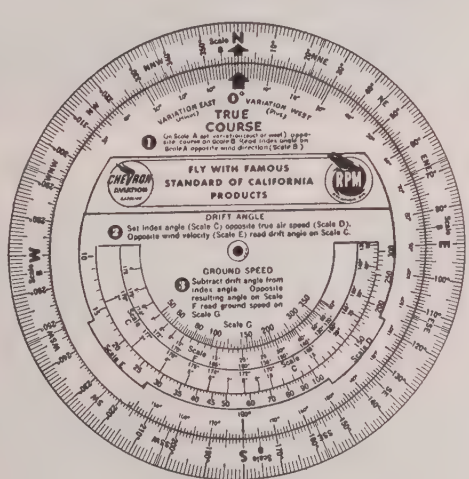
② Get the nose down

③ Don't bank sharply

④ Don't stretch the glide



Compute fuel consumption with your flight indicator



You're welcome to this free speed and distance calculator

Your handy little flight calculator helps you work fuel-consumption problems as you work time, speed and distance problems. Simply substitute gallons for miles, and gallons-per-hour for miles-per-hour. If you haven't received your calculator yet, drop in to your Standard Airport Dealer for your free copy soon.

"We take better care of your plane"

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

Standard Oil Company of California

C.A.P. News from Hq.

THIS PAGE, in this issue of Skyways, inaugurates a monthly report on the activities of another member of the military family, the Civil Air Patrol. More often considered a step-child of the U. S. Air Force, the CAP actually is a full-fledged Auxiliary, enjoying a unique status. The military establishment contributes equipment by outright allotment of surplus material and the loan and limited maintenance of other items of current usage. The Air Force exercises a monitoring and guiding function, supervises training programs, and maintains a relatively small force of Air Force personnel manning the National Headquarters organization and a liaison officer in each state. Otherwise CAP is a strictly civilian organization, completely on its own and, more important, incurs no military obligation for any individual member.

The CAP-USAF relationship is not restricted simply to material aid and liaison functions. The plans for CAP in the event of a National emergency will reinstitute roughly the functions of the CAP during the past war, with modernized trimmings of course. But for *now*, there is already in effect a Standing Operating Procedure for utilizing the widespread units of CAP in the USAF Air Rescue program.

CAP Search Equipment—Literally hundreds of CAP units in localities throughout the country have procured special equipment for air search and rescue activities. Some of the equipment is surplus material while other items are purchased or specially constructed by the CAP members themselves. Field glasses, stretchers, medical supplies, cold-weather equipment, survival kits, and numerous other items are held in readiness. The CAP flyers have been given special briefing on proven search procedures and emergency signalling and operations methods. The CAP is therefore ready to be called and may be put to work by a simple request from the AF Air Rescue unit having jurisdiction in the area. This air search and rescue function is utilized for any eventuality where air search or patrol is required. It is not limited to search for military aircraft or personnel, nor is AF Air Rescue activity so limited. All CAP search and rescue activity is by volunteers, and the Air Force may, when the activity is requested by AF ARS, supply fuel and oil for CAP aircraft.

CAP Search-and-Rescue Flights—This CAP-USAF pattern has many possibilities. During Christmas week, CAP flyers found a crashed civilian plane in the California mountains after five days searching, including Christmas Day. More recently, CAP flyers searched for and found a crashed flyer in the snow-covered mountains of northwestern Colorado. In this case, the pilot had survived and within two hours after locating the downed airman, the same CAP crew returned in an airplane equipped with skis, landed, and evacuated the badly frozen man to a large airfield from which an AF Air-Rescue plane then transported him to a hospital.

In Florida, a lost civilian airplane required an extensive search of thousands of square miles. The airplane was not found, and is presumed to have crashed in a lake or in the gulf. However, since the area was carefully covered by CAP searchers, there is little possibility of a hurt survivor not being recovered for lack of a careful search.

During the heavy snows which blanketed the Rocky Mountain states this winter the CAP was very active. The CAP organization were too busy saving lives and relieving suffering and danger to do much talking about their work. However, the activities reported about "light Army planes" and "civilian patrol pilots" as well as the "Army courier service" and "Red Cross Flyers" were really the Civil Air Patrol in action.

National Board Conference—One of the highlights of each year in the CAP national program is the Annual Presidential Dinner. This year Nat'l Board conference will be held May 10, 11, and 12 with the big dinner the evening of 11 May. In line with the recognition of the importance of youth in CAP as represented by the CAP Cadet program, each Wing Commander will bring a selected outstanding CAP Cadet from his state to the conference and dinner.

We have presented here some of the highlights of CAP up to date. There will be more in succeeding months on CAP plans for Cadet Encampments, emergency activities, the CAP Radio Network and other phases of the Civil Air Patrol.

CAP CADETS get a liberal education in aviation. Boys (above) study military plane

PLANES of CAP Squadron have been used for search-and-rescue on several occasions

Pilot Report . . . New Cessna 170

(Continued from page 22)

level has been dropped even lower than on previous models by the application of rubberized "dum-dum" over the entire inside of the fuselage.

This particular airplane, N3844V, was fitted out as a demonstrator and had a number of accessories installed. On the instrument panel were a sensitive altimeter, rate of climb, turn-and-bank and two-way radio. Outside the ship hung a Goodyear crosswind landing gear. That's the free-castoring unit that will swivel up to 30 degrees in any direction with a crosswind of over 15 mph.

"That gear really kept me out of trouble on my trip out here," said Mr. Renshaw as we circled back toward the Glen Ivy flight strip. "I came in for a landing at Rock Springs, Wyoming, just before dark. The airport was under four feet of snow and the only runway open was just 90 degrees to a 35-mph gusty surface wind. To make matters worse, there was ice on that lone runway.

"I came in with a strong crab angle into the wind and made no effort to swing the nose back toward the end of the runway. When the 170 hit, going nearly 30 degrees out-of-line to the runway, the wheels castored and I rolled straight down the icy strip to a comfortable stop. I believe that a conventional gear might have weather-vaned on the ice and put me into a snowbank alongside the runway."

Nearing the field, we tried some slow flight. At an indicated 60 mph there was no sign of a stall—even from the red-and-noisy safe flight indicator. With full flaps and partial power there seemed to be no tendency for the 170 to settle as the 50 degrees of flap were jerked rapidly out from under the airplane.

We circled the Glen Ivy strip and watched the palm trees wave in the breeze. The wind had picked up perceptibly on the ground and we asked Mr. Renshaw about landing downwind.

"Everyone seems to land downwind here. There's plenty of up-grade at the far end of the field to slow you down once you're on the ground. Come in low, under power, and keep your speed down to at least 65 mph as you come across the end of the fence," replied the factory pilot.

Close to the ground there was considerable turbulence and the easy-to-handle controls were right in their element. As we turned in on a long final approach, we dropped full flaps and spilled our airspeed from 75 to 65 mph.. The ground seemed to be rolling by plenty fast so, out of the corner of our mouth, we asked Mr. Renshaw, "What about slowing up to 60. Will she stay right side up in this rough air?"

"Sure, go ahead," was the casual reply.

When we crossed the bright yellow bushel baskets atop the three-foot barbed-wire fence at the end of the runway, we were about 10 feet in the air and indicating an even 60 mph. The ground was going by a lot faster than that. As the fence flicked past, we snapped off our remaining power and started back on the control wheel. The other end of the runway seemed to be coming up mighty fast.

There was just a little float left in the airplane and the red stall warning light blinked on as we came back on the wheel. The 170 floated for not more than two ticks of a watch, but it seemed a lot longer than that. Then she landed tail-wheel first as we came clear to the stops with the controls. Cessna's vanadium spring steel gear took the worst of the bumps out of the cow-pasture runway that was eroded by recent rains.

As the fully-loaded 170 started its fast roll-out, aided by a quartering tailwind of at least 20 mph, the crosswind gear began to swing free. It was a most unusual feeling to be rolling down this small flight strip with the nose of the plane swinging off to the right—but the plane itself going straight ahead.

Instinctively, we applied a little left brake to line the nose of the plane up with the runway and the whole ship started off to the left. We laid down the imprint of a shallow "S" with the tires on the soft runway before coming to a stop. Then we had to taxi nearly half the length of the runway up to the parking area.

Actually this crosswind gear is at its best if a pilot will leave his feet on the floor and forget about it—but that's hard for the first few landings.

There are nine minor changes under the hood of the new 170.

(Continued from page 57)

Digest Nose-Diving Navy?

(Continued from page 45)

expendables . . . I have no doubt that when military history is written these marine mastodons will be cited as a prime example of strategic folly." A pure and simple case of ignoring the record.

Of course, the carriers have withstood all of the Digest's diatribes. So the magazine started to peg at the strategic need for carriers. For this attempt to scuttle the bombardment-proof ships, the Digest is publishing a series by Huie and touting Seversky as "Denounced as an extremist and hailed as a prophet . . ." What was so extreme and prophetic about asking for 8,000-mile range bombers in 1942 when bigger planes than he imagined were over four years along in construction? Seversky pleaded for B-19's (Have you looked at a picture of it lately? What a "patsy" it would have been for attackers from any angle!) As a matter of fact, according to a current report (*Time*, Feb. 28, 1949), "*. . . every U.S. Army warplane that played a part in World War II was on the drawing boards before Pearl Harbor.*"

The generals couldn't answer that Boeing had been developing the B-29 since 1939! Nor would they reveal the secret that ground was broken in 1941, to build a plant to make B-36 bombers, and that the design of the B-36 was submitted to the Air Force in August, 1941. (*Aviation Week*, March 14, 1949).

The B-36 with six engines of 3,000-hp each (later 3,500 hp) was discussed and started *a year before Seversky had his vision of a plane with six 1,200-hp engines!*

The magazine doesn't question the accuracy of its two settee-staff officers. It seems content that they agree to its "line" even if they disagree radically in their reasoning. To wit—

Huie bases his plan of war, against a mythical country named Russia, on the atomic bomb. He says in the January, 1949, issue of Reader's Digest, "*They would be wiser to heed David Lilienthal when he declares, 'Some people are beginning to say this man-made earthquake isn't so bad after all. Believe me, it is!'*"

Then Huie surmises, "*as to whether one, two, or more atomic assaults would be necessary to paralyze Russia, . . .*"

On the other hand his co-expert, Seversky, was one of the people Lilienthal was talking about. After an interview with Seversky on February 19, 1946, the *New York Times* headlined, "DISCOUNTS THE IMPORTANCE OF ATOMIC BOMB." It quoted Seversky as saying, "*It is 'fantasy' to believe a nation can dispense with its defense on the theory that the atom bomb makes 'push-botton' warfare a reality.*"

He goes on,"*Actually the atomic bomb is a great 'face saver' for our military leadership . . . there are many wholly unfounded and 'pseudo-scientific assumptions' about what it actually did at Hiroshima.*"

If the bomb is such a 'face saver' whose face should it save now, Huie's or Seversky's? Are we to believe "pseudo-scientific assumption" that we can put all our atomic eggs in one flying basket and sink the Air Navy . . . or Seversky's contention that the atom bomb is a dud? Come now, boys, get together!

The boys got together on the hope that bombers are immune to fighter attacks—though Seversky hedged. If this were true, it would eliminate the Navy's role as fighter escort from outside hostile shores.

Huie visions bombers over Moscow in a heavy overcast. He hints that he knows of mysterious gadgets which will jam the enemy radar and defensive equipment.

First of all, radar is a lot more fool-proof than it used to be. And while it may never be proof against a second lieutenant, we can't hope to have the luck the Japs had at Pearl Harbor.

Then, in accepting General Vandenberg's statement that the B-36 "can outmaneuver an interceptor at 45,000 feet" we must remember this one incontroversial mathematical fact: an interceptor *should* fly higher and faster and better than a bomber. You can't load a long-range plane with a tremendous weight of bombs and fuel and expect it to compete with a high-performance ship without all that drag.

Though it may be the goal of the Air Force to build a bomber that could out-fly a fighter at high altitude, can we afford to base our strategy on at best a temporary advantage? Must we not take into account the fact that designers may, and probably will if airplane history repeats itself, soon come up with a jet job that will outperform the bomber at *any* altitude?

There is no doubt in the pilots' minds as to whether an unescorted bomber has a chance against a fighter. One Navy veteran with a record of "kills" to back up his statements said, before he was gagged, "Any interceptor pilot who gets shot down by a bomber is a fool."

Huie attempts to prove his premise with a rumor about "*recent maneuvers showed that Britain can't stop our bombers.*" That sounds more like a gambit in the war of nerves than a fact. If it were true, it probably would be on the top secret list.

As long as he went to Britain for proof, why didn't he report what Major General J. F. C. Fuller had to say about strategic bombing? The general, who is surely in a better position to judge than a civilian writer, studied the whole problem and then stated firmly that strategic bombing "actually impeded speedy victory."

More and more military experts are beginning to agree that this type of bombing of civilians and industries is not only morally wrong, but militarily wrong.

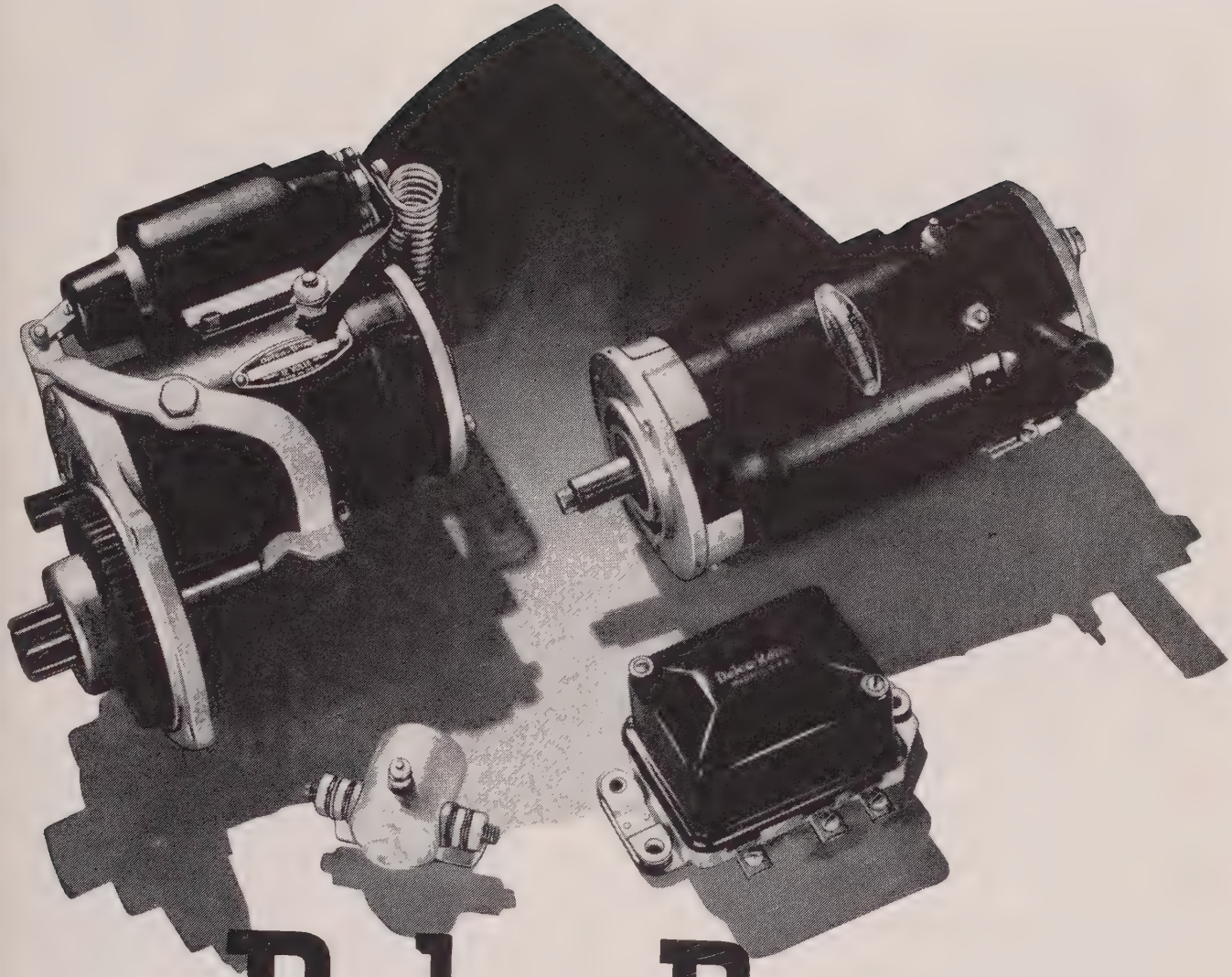
Why doesn't the Digest publish this side of the story? Could it be because it has assumed that strategic bombing is the firm base on which to build its whole—to use Seversky's word—"fantasy"?

If they admit strategic bombing doesn't stop the enemy, the Digest's carefully propped up tree of one-sided arguments will come tumbling down. Then they'd have to admit that the Army has an invasion job to do, the Navy has a defensive and offensive job on the seas and in the air, and the Air Forces has a big important job, too, but not the *whole* job.

We could present the Navy's case here in opposition to the Digest's lopsided story, but we have no desire to pass lopsided pomes. If, and when, we consider such problems as: Can long-range bombers reach targets deep in enemy-held territory without fighter escort? What force prevents war from reaching a stalemate? Can carriers increase the enemy's perimeter of defense? etc . . . we will endeavor to give you *all* the available facts. We'd let you consider who could best cover the troops landing on enemy-held shores . . . the possibilities of a fast carrier task force harrying the enemy from almost any shore and then losing itself in 2,000,000 square miles within 24 hours, and all the viewpoints that would enable you to have a truly informed public opinion.

You have the right, stated by General Omar Bradley, Chief of Staff, to be a home-grown general. But before you leap from your chair to do as the Reader's Digest orders, read all sides of the question in this magazine and elsewhere. Don't take sides to carry on a fratricidal war. Try to reason out a solution that is best for you, for your country, and best for the services which must protect both.

PIASECKI XHJP-1, first copter to be looped, is called one of world's fastest. Powered by 525-hp Continental, the XHJP-1 has a maximum speed of 131 mph.



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DELCO-REMY—WHEREVER WHEELS TURN OR PROPELLERS SPIN

Carriers Can Do

(Continued from page 19)

heard the statement, "It is obvious that a carrier cannot operate against land-based air." While this statement has been made generally by individuals who are not familiar with the Navy and its sea-air power techniques, the fact that people *do* think this way must mean that there is some reason behind it. The fact that so many of our supposed air power experts have advocated this idea has caused many people to stop and think.

The Navy itself has not lagged behind in playing the "devil's advocate" and has studied extensively and with great care the employment and development of carrier air power. How can we explain the fact that, of the 12,268 Japanese airplanes destroyed by *carrier-based airplanes* in the Pacific war, 11,368 were land-based airplanes? How can we explain that our pilots and airplanes destroyed 18.4 enemy aircraft for every one they lost when they were carrier-based, but these same pilots and same aircraft could only destroy 7.3 enemy aircraft for every one they lost when they were operating out of land fields? Surely these facts demonstrate that the carriers were a highly efficient means of application of air power during the Pacific war and operated against extensive and powerful land-based air forces.

How are to explain this fact when it is matched against the statement that it is "obvious" that carriers cannot operate under land-based air. Must we assume that our planes and pilots were better built and better trained than those of the enemy; that our enemy was an inferior power? The pilots and fighting men who fought the Japs would not substantiate any such statements. They would tell you of the days when the Japanese *Zero* was outperforming our aircraft in every way. They would tell you also that the Japanese pilot, although prone to stunting and flat-hatting, was an excellent military pilot every bit as good as our own. No, indeed, the men who faced the Japanese during the first part of World War II when we were beaten back thousands of miles would not tell you that Japan was an inferior force.

The key to the fighting ability of carrier-based air power lies in a little known theorem called "Lanchester's Law". Frederick Lanchester was a British subject who wrote extensively in the field of air power during the period preceding and after World War I. His book "The Aircraft in Warfare," is considered by authorities to be one of the most outstanding analyses ever written on this subject.

Lanchester's Law applies to the generalized fighting unit regardless of its kind. It states that the fighting power of an aggregate of fighting units is proportional to the square of the number of fighting units. The relative fighting power of two opposing fighting forces is determined by the ratio of the squares of the number of units on each side. And not only does this ratio determine who would win the engagement (assuming correct application and direction of the forces) but the value of the square of the number of units determines the rate at which each force was attritioned and thereby how many units would be lost by the superior forces during the complete destruction of the inferior force. Lanchester applies this law to analysis of many battles.

The thing we are most concerned with at present is the manner in which this so-called "square law" is affected by distance. In view of the known performance-ability of aircraft it is obvious that under any given set of conditions the per cent of our total available aircraft which we can maintain in combat in a given area decreases as the distance of that area from our base increases.

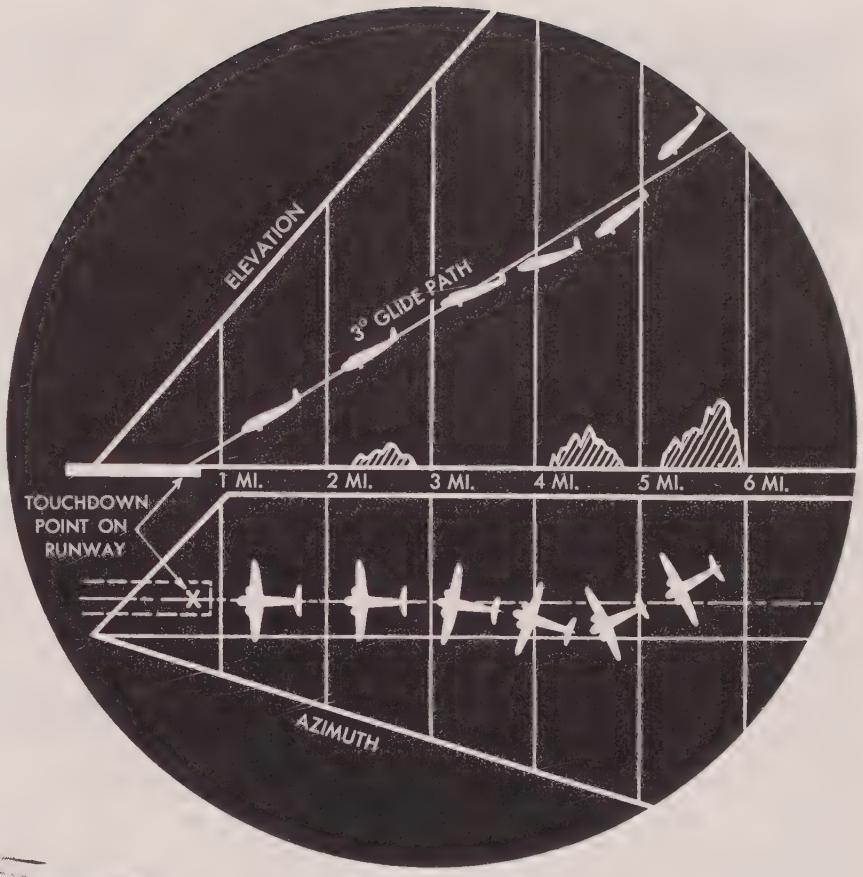
Essentially, what we have just said is that our air weapons are much more effective *close* to home than at great distances from their base. Herein lies the key to the success of the aircraft carrier as a means of application of air power. In order to achieve results in the air of a decisive nature, we must "close the range". This means that we must bring our bases closer and closer to the scene of action. As we do this our superiority grows to a degree that forces the combat area as selected by the enemy to drop back closer and closer to his own bases (Lanchester's Law) to retain his own combat efficiency. Eventually we have close action in which the combat area essentially includes the enemy's home bases at which time, if we have superiority in the air, his aircraft will be destroyed rapidly while still on the ground. Thus it is fundamentally the function of the aircraft crrier to "close the range" and carry the fighting to the enemy.

Let us regard the reverse action: the enemy attempting to attack our carriers. Here again we find Lanchester's Law playing a vital role. As the enemy's aircraft must fly long distances to reach our carriers, we find their over-all fighting efficiency considerably reduced. In establishing our own fighter air cover, we carefully select the combat area as a ring around the carrier task force, roughly from 25 to 50 miles in radius. Thus, when the carrier task force is, let us say, 500 miles at sea, our protective fighters are only 50 miles from home and therefore vastly superior to those of the enemy who must come from bases 500 miles away. This, of course, assumes equal numbers of fighters available on both sides, a condition which can generally be attained, if not bettered, by the carriers as a result of their ability to operate at any given place along the coast that they choose. So, we find then that our carrier planes have a considerable superiority of fighting ability over those from distant bases.

Now obviously we are faced with the problem of interception of incoming attacks from all directions. In order that our combat air patrol or defensive fighters be maintained at a minimum until the enemy is committed to heavy attacks, it is essential that we aid these defensive fighters in every way possible. To do this the Navy has developed an extremely effective system of radar interception. The radar screen is laid down around the task force at such a distance as to provide adequate warning to enable combat air patrols to intercept individual incoming attacks and to permit time for the "scrambling" of considerable defensive forces to meet the oncoming attacks. The radar ships are deployed at considerable distance from the task forces in such a way as to provide an

(Continued on page 59)

Landing your Transport *on Fail-Safe* GCA*



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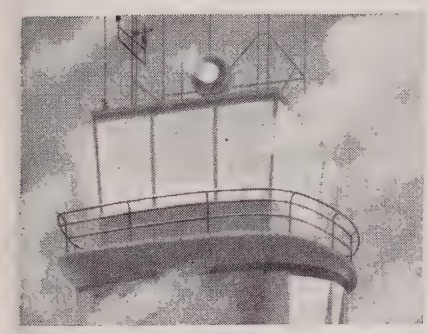
Among the developments of GCA for the U.S. Air Force, Gilfillan considers the Azel Scope one of its chief contributions.



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LOS ANGELES

Gist of June

Pilot's Report . . . Midget Mustang

In answer to innumerable requests for a pilot's report on this trim little racer, SKYWAYS will bring you a Private Pilot's account of how the Midget Mustang handles and what it's like to push pylons.

June Issue

Air Navy's XF7U

(Continued from page 17)

roots, carrying the ram air back into the fuselage to twin Westinghouse axial-flow jet engines set side-by-side between the wing sections. The type of engine has not been announced, but it is presumed to be a development of the J-34 (24C) rated at 3,000 lbs thrust. Each engine is linked with an afterburner, ending in twin exhaust pipes just beyond the trailing edges of the horizontal flight-control surfaces. In effect, the engines are set between the wings, and the forward fuselage is placed directly in front of them.

The wings of the XF7U-1 are among the most complicated designed for a non-research aircraft. Seemingly the only extra gadget not included within the wing confines is the tail hook for carrier landings. This is located between the engine outlets at the extreme tail. The wing sweepback and cathedral (negative dihedral) measurements are secret, but they are estimated to be greater than those in the Douglas D-588-2 *Skyrocket* research plane (33 degrees and five degrees, respectively) and the sweepback also appears greater than the 35 degrees estimated for the North American F-86 and the McDonnell XF-88.

The plane has no landing flaps, but leading edge slats move forward for the relatively extreme nose-high landings. These slats increase wing lift and delay the stall, critical on swept-back designs. For reducing speed rapidly in maneuvers, dives and landing approaches, horizontal speed-control brakes, part of the normal trailing edge wing area, are set on each side of the engine section, extending out to the vertical stabilizers. Outboard of the fins, to the wing tips, are the combination ailerons-elevators, called "ailevators", and differing only in nomenclature from elevons used in flying-wing designs. Following the conventional rear movement of the cockpit control stick, the two surfaces move up or down as elevators, or with a side stick movement operate separately as ailerons. Each surface includes large tabs. The departure from the flying-wing system are the twin rudders, behind the standard vertical stabilizers and above bulbous under-wing extensions.

All controls are operated by hydraulic-powered jacks to overcome the tremendous forces generated in high-speed flight, an indication of the speed range expected of the plane. The stick movements create signals which are transmitted to the hydraulic units that do the actual work. This system requires the installation of artificial drag in the pilot's share of the controls to simulate the forces which would normally be felt without the one-way boost power. Emergency manual control is provided through direct connection to tabs.

For shipboard operations the wings will fold outboard of the fins.

The comparision of the *Cutlass* (aside from its spearhead-like aspect in flight) to a giant squatting insect while on the ground is due to the unusual landing gear. Heretofore, American tricycle-gear jets were designed to sit fairly level on the ground. The *Cutlass* not only has the largest gear in length and diameter yet seen on a U. S. jet fighter, but the high nose strut raises the pilot to a position at least 10 to 12 feet above the ground. The tail end of the plane, however, is only a couple of feet above terra firma. The probable reason for this lies in the low-aspect ratio wing—a desire to give it a high angle of attack not normally available for take-off without a distance-eating run.

The large diameter of the struts may be due to the need for structural strength to bear high aircraft weight, plus the impact of carrier landings.

One of the things that has plagued aircraft designers has been the question of where to hide the landing gear when retracted. Jet fighters in most cases have higher gross weights than reciprocating engine fighters and along with slimmer wings and the need to use a wide tread to give landing stability, the gear has had to be made thinner in order to fit into the wings. Tire bulk has been cut by the use of very high pressures in smaller, tougher casings, but that still hasn't completely solved the problem.

Chance Vought provides one answer by bringing wheel pants back from out of the past—not quite like the old fixed shields, but the new version performs the same job. The heavy forked main gear retracts straight back into wells in the wings below the vertical stabilizers. The bulbous under-wing units mentioned previously are faired doors that enclose the retracted wheels, streamlining their bulk. The nose gear, equipped with a shimmy dampener unit, retracts into the fuselage behind the gun bay section. The undercarriage, so obvious on the ground, is cleverly tucked away in the air.

Several items installed on the experimental *Cutlass* will not be part of the production model. Radio and radar antenna will be the concealed flush-type in production models. The two long booms, one at each wing tip, for a yaw meter and a pitot-static tube, are for test purposes. The regular pitot tube is at the top of one stabilizer. Small plastic windows in the aft section of the pilot's canopy and in the fuselage are for test-camera installations.

Since the Navy has announced the *Cutlass* as an all-purpose fighter, production models might be adapted for interceptor, radar night fighter, photo reconnaissance (that long unobstructed nose) and various attack versions.

While the XF7U-1 might at first appear to be a fantastic hodgepodge of experimental fantasies, actually it follows logical requirements for a high-speed fighter plane, fully worked out and tested in wind-tunnel experiments. The weird shape is dictated by the necessity for fitting all the components into one small airframe without complicating any of the elements beyond the points where production or maintenance become too expensive or difficult. The odd gull-wing of the Vought F4U *Corsair* is proof that this company carries design quirks to highly successful conclusions.

In the onrushing military aircraft development race, both U. S. and foreign, many newly revealed designs appear to approximate each other in one respect or another: types of swept-back wings, control systems and even in over-all appearance. Actually the designers are

applying known principles in accidentally parallel lines of experimentation.

Of course, in any type of engineering the designers always evaluate known work to insure the soundness of their own projects and they do borrow previous ideas or test experience. Incidentally, the one plane that was considered valuable in providing data on tailless aircraft was the Vought-Zimmerman V-173, the so-called *Flying Pancake*, flying model for the XF5U.

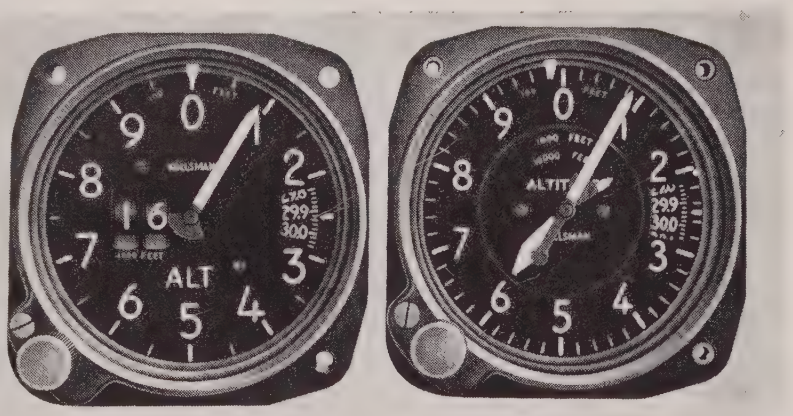
No one or two individuals were responsible for the final *Cutlass* model, which evolved from the efforts of a large team, as is usually the case with complex modern aircraft. Since the top personnel in charge of Chance Vought experimental development are logically the ones finally responsible for the Navy's new prize package, they should get the larger amount of credit. These include: Paul S. Baker, engineering manager; James M. Shoemaker, chief engineer; F N. Dickerman, former chief of design and now assistant chief engineer and currently in charge of the flight test program on the airplane at Patuxent; W. C. Schoolfield, chief of aerodynamics, and Nevin Palley, who headed the development group where the original design studies were made. J. R. Clark was project engineer on the *Cutlass* at the beginning of its development and later headed the experimental shop in charge of building the flying prototype.

During the Patuxent Naval Air Station flight-test program the plane will be fully explored by a Chance Vought-Navy team, notably Capt. F. M. Trapnell, famed Navy test pilot who made the first public demonstration flights. But the man who has done much of the preliminary flying of the XF7U-1 since it first took to the air at the end of September, 1948, is J. R. "Bob" Baker, 28-year-old experimental test pilot who has been with Chance Vought only a year and a half.

Born in Millville, Pa., Baker was graduated from Rensselaer Polytechnic Institute with a B. S. in Aeronautical Engineering in 1941 and remained as an instructor at RPI during the year following graduation. In 1942 he became production test pilot for Curtiss-Wright at Buffalo and six months later advanced to experimental test. March, 1945, saw him join NACA as engineering test pilot at Langley Field, Va., and then on June 16, 1947, he came to Chance Vought. In his five years of test flying he has accumulated 3,250 hours in 24 different types and models of aircraft. He's married, has a four-year-old daughter and lives near Patuxent while the *Cutlass* program is under way.

On the basis of less than 20 hours of flying by the test team, naval authorities are enthused enough by results to admit that they expect the *Cutlass* to be the fastest operational jet fighter, carrier or land-based, in the next few years. It has been built to fly as high as any jet, and take-off and landing speeds and distances have been calculated for full carrier operations.

The XF7U-1 looks like a superlative fighting plane; however, turning back to that corny barker—that might be the tops, but folks, stick around, there should be another behind this curtain over here, and you ain't *really* seen nothin' yet!



New Kollsman "160"

Kollsman's new "160" sensitive altimeter *(above left)* speeds up and simplifies reading of flight altitude. It employs one pointer and two-digit counter instead of three pointers as on standard altimeter *(above right)*. The "160's" single pointer makes one revolution, registered on the counter, per thousand feet.

Needle, Ball and ... oh Hell!

(Continued from page 27)

pilots are in a good position to tackle some mighty wild weather. Normally there are two or four engines out on the wing panels, good de-icing equipment, plenty of gyro instruments and the best in radio aids. As a last resort, they've parachutes aboard most planes.

Airlines, too, have the cards dealt in their favor. Their Captains fly the same route day and night, month after month. They know every little bend in each beam along their course. They practice let-downs constantly on clear days and, whether it is ILS or GCA, there's always a guy on the ground to give them a hand.

But what about the little pilot with his brand new instrument rating?

Nine times out of 10, he'll fly a single-engined airplane with a needle, ball and air-speed for "gauges." He'll probably have no de-icing equipment except carburetor heat. Normally he'll have a single midget two-way radio that can go out when the weather gets rough and he needs it most. He's already had two strikes against him.

And there's no one to decide when not to fly but the pilot himself. He's usually in a hurry to get somewhere—so what are a few clouds in the way? After all, he's one licensed pilot in 20 who has an instrument ticket!

Of the group sitting around for "just one more sequence" in Amarillo, the first pilot to go out and try to get through was a youngster in a Cessna 120. He was headed West and the CAA station at Otto near the pass into Albuquerque was reporting: "Overcast. Ceiling 600 feet. Visibility two miles. Temperature 34, dew point 32. Light snow showers. Mountains obscured all quadrants."

The Air Force pilots and the Navy pilots with their twin-Beechcrafts and B-25's sat on the ground with the older, more conservative puddle-jumper pilots.

The eager youngster with his brand new instrument ticket headed out into the wild grey yonder. One of two things would happen: either he'd be lucky and get through, or he'd make a small headline in his local newspaper.

The impatient pilots began swapping weather stories.

Take the case of a well-known Los Angeles flying contractor. He's a little embarrassed about it, naturally, so let's withhold his name. He took off for an Eastern business appointment with a full load of passengers in his speedy Howard. He didn't have an instrument ticket, but when he encountered a broken overcast covering the Dakotas, he kept right on going east. He was in a hurry and he had a little tailwind. Soon the broken ceiling turned into a solid overcast, but it was nice and smooth up there (it always is) and the contractor didn't make that 180° turn. Finally he was low on daylight, out of maps, lost and almost out of gas. He had to make a straight-ahead let-down through the clouds into—he didn't know what!

He was lucky and broke out at a thousand feet off the ground. He landed right-side-up in a farmer's field, out of gas—but he'd learned his lesson. Now he's hired a pilot with good instrument training and a little weather know-how.

Unfortunately, there isn't an airport in the country that can't match or top that experience a hundred times over.

"That instrument card is swell," said Hazelton to one of the other old-timers in the Weather Bureau. "There's nothing like it to smooth up a pilot's contact flying. I think that every pilot should have one—when he's had the weather map experience to back it up.

"One thing that so many up-and-coming pilots don't know until they've stuck their necks out a mile is that there's a whale of a difference between flying simulated instruments under a hood or working a let-down in a Link Trainer than actually flying through rough-and-tough storm fronts. When the radio begins to pop and sputter in your ears and the rain or hail makes so much noise bouncing off the ship that you can't hear the engines, there's a psychological reaction that just can't be duplicated in training."

In time, the talk in the Weather Bureau got around to when a pilot should turn around and call it quits. One twin-engined pilot answered,

"When there's no possible chance of getting through safely, then I head for home."

A *Cub* pilot answered, "When I can't see the ground for 10 seconds, that's enough for me."

A middle-aged charter pilot who had passengers waiting in the lobby below answered, "When I start asking myself just what in hell am I doing up here anyhow, then I turn back for the nearest airport, cow pasture or wide spot in the highway."

"Here's an idea that might help to keep some of the boys out of trouble." The speaker was flying a big Cessna 195. "Why not have a sign over the inside of the door at each of these weather stations. Put it where pilot's couldn't miss it on their way out. It should say, 'When in doubt, DON'T."

The stories continued as the smoke inside and the fog outside became heavier.

Even a well-trained pilot occasionally gets into a jam with the weather. Jim Most ("Who Says I Can't Fly" SKYWAYS January, 1949) has nearly 5,000 hours to back up his instrument ticket, so he didn't worry too much when the weather began to cloud up on a hop between Albuquerque and Los Angeles in an old Lockheed *Vega*.

He had a full set of gyro instruments and an ADF (automatic direction finding radio compass that will point toward any radio transmitter.) Over Winslow, Arizona, he checked the weather by radio. Broken ceilings were reported, but both Phoenix and Needles were clear.

"My one mistake," said Mr. Most, "was not to take into consideration that there were *no* pilot reports available. No wonder—there was no one flying out there and I soon found out why!

"West of Winslow I wandered around the broken clouds. It looked dreary over the nose of the old *Vega* and I ran into a blizzard over the Meteor Crater. I made a quick 180° turn and talked to Winslow again on the "phone." They still gave clear weather ahead.

"I could see a little daylight off to the south toward Phoenix so I headed out and went lower and lower to stay under the stuff. Pretty soon I was headed east, still chasing that little spot of daylight. I finally turned back toward Winslow but it had 'socked in' behind me.

"There I was, nearly 100 miles southeast of Winslow and right down on top of the 9,000-foot rocks. My maps showed one nearby peak at 13,000 so I picked out what looked like a clear area and started up though the stuff. A few minutes earlier I could see patches of blue sky flicking by above me and the overcast didn't seem to be more than a few thousand feet thick.

"At 11,000 feet the old *Vega* began to pick up ice. At 15,000 I was still carrying a load of ice and still on instrument. I was bouncing around the cockpit because of the turbulence and all the cockpit windows were frosting up. I wasn't happy.

"Finally I staggered out the top of the clouds—at 26,000 feet! With no oxygen

ard, I was getting pretty groggy. I was deep valley with clouds tapering up to east 35,000 feet on both sides of me. ooked beautiful; what little I could see t through the little holes I'd scraped ugh the frost on the inside of the dshield with my credit-cards.

Five minutes later the clouds began to away and when I landed at Phoenix, e wasn't a cloud in the sky. What had pened was that I'd climbed right up ugh the center of a storm front.

And to finish up this flight, I walked the Weather Bureau at Phoenix just two pilots were going out to their old et trainer for a contact flight to Wins- . There had been no reports of that m because the weather stations are few far between in that desert region."

It can be bad enough when you've got best of equipment," said one of the itary Ferry pilots who was waiting for tact conditions to deliver his twin- chcraft to Dallas. "But suppose Dil- 's pal in a little civilian airplane makes his mind he wants to go into a busy ropolis like Chicago—and use his new rument ticket.

If he follows the CAA regulations and a flight plan, chances are it wouldn't approved. Suppose, however, that he into the air and chases his needle, ball air speed toward the Windy City.

Chicago has GCA, ILS and VHF ound control approach by radar, instru- t landing system requiring special air- n instruments and very high frequency o transmission now being installed on some of the latest lightplanes). During a spot check recently, over a 16-hour period of near-limit weather conditions, an airplane was landed at an average of every 3.6 minutes. Between each arrival, a plane took-off; so there was a landing or take-off each 100 seconds. Imagine what a Dilbert with a brand new needle-and-ball card would do to that stack of airliners!"

By mid-afternoon, the Weather forecaster at Amarillo said that there were passable VFR (visual flight rules) conditions southwest toward El Paso. When he added that Amarillo would probably be "socked in" for most of the next day, Mr. Hazelton and the two other pilots bound for the West Coast made a rapid departure. Two *Bonanzas* and a Cessna 195 took off from the slush-filled runways at English Field within two minutes of each other.

An hour and a half later all three planes were on the ground at Roswell, N. M., for gas and more weather information. The latest report gave the ceiling at Guadalupe Pass as 800 feet. El Paso had a thousand-foot ceiling with a two-degree "spread" between the temperature and dew point. There was a scant hour of daylight remaining so the three airplanes were tied down.

The next day was a repetition of Amarillo's weather. The group of pilots loafed around the Roswell Weather Station. They smoked innumerable cigarettes, looked out the windows at the half-mile visibility restricted by a ground fog and waited for "just one more sequence." Just before dark the weather broke a little, but all

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Pilot Report . . . Cessna

(Continued from page 49)

Continental has added an oil slinger just back of the front thrust bearing to eliminate oil leaks around the prop hub. Wrist pin plugs are pressed to fit and will not rotate. A drop-forge cam shaft and changes in the valve-spring provide longer engine life, according to engineers.

At last Cessna has been able to license their four-placer without a fuel pump. Two 21-gallon tanks are completely gravity fed and a gas selector valve is mounted between the front seats on the floor.

A safety catch has been put on the mixture control and the pilot must squeeze it before the knob will move. It's just a little gadget but it may keep more than one pilot out of serious trouble.

With the addition of a dorsal fin forward of the rudder, the new 170 looks much like a scaled-down 195. Added fin area gives better directional stability and makes it easier to fly hands-off in choppy weather.

All in all, there have been 18 changes aft of the firewall on the new 170, ranging from the all-metal wing to a new safety latch that will hold the flaps up when the airplane is parked tail into the wind.

Actually this ship seems to fly just a little faster at high speeds and just a little slower at low speeds than the older model.

If sales reports for the past six months are any sign of the times, this Cessna 170 should soon appear on the flight lines. It's a good plane—made even better.

BULLET, designed by former builder of Johnson Rocket, is four-place all-metal plane powered by 185-hp Continental. Equipment includes jet assist

Needle, Ball and...oh Hell!

(Continued from page 57)

three pilots said, "Oh Hell" and went back to their hotel rooms, primed for an early start the next morning.

For the first time in a week, the sky at Roswell was clear. Hazelton took off not too long after dawn and landed two hours and 10 minutes later—between snow squalls—at Lordsburg, N. M., for gas.

His *Bonanza* picked its way between broken thundershowers and snow squalls that topped the Pinaleno and Galiuro Mountains. Tucson radio broadcast clear weather as far as Indio, California, but advised that Beaumont and Riverside (March Field) had marginal weather.

Hazelton landed N8473A at Blythe, California, for gas and a last-minute check on the Los Angeles weather. The CAA communications station gave the Beaumont Pass, eastern entrance to the Los Angeles area, as "Estimated ceiling 600 feet, overcast. Visibility two miles. Wind south, southwest 12. Light blowing snow. Pilot reports tops at 13,000 feet."

Riverside's March Field reported scattered clouds at 3,500 feet with a temperature-dew point "spread" of three degrees, and fog to the southeast. Los Angeles and Burbank were clear, except for haze.

So Hazelton took off from Blythe and began to climb. The little *Bonanza* went up to 14,000 feet and leveled off on top of the broken clouds. Part of the climb was aided by strong lenticular-wave updrafts which shot the rate-of-climb indicator up to over 1,500 feet-per-minute.

Over the CAA range station in Indio, the ground was still visible through scattered holes in the clouds. The 11,485-foot peak of San Gorgonio and the 10,805-foot peak of San Jacinto that form the Beaumont Pass were barely visible between the cumulus build-ups. Since there was always a large section of desert visible through the broken clouds, Hazleton plowed on over the top.

Smoggy, though cloudless skies, capped the Los Angeles area as Hazelton let-down leisurely into the Rosemead Airport. Even though his 1,300-mile flight had taken seven days, the pilot's good judgment was rewarded.

He beat the Stork home.

There isn't a pilot in the air today, including Ben Hazelton, who isn't razzed almost to death by his paddle-footed friends when he goes out on a flying trip and returns days overdue or leaves his airplane on some muddy airport and travels home by bus. Chances are, however, that the airman who waited out the weather did precisely the right thing.

The nearest Weather Forecasting Station to Hazelton's San Marino home is located at the Los Angeles Municipal Airport, formerly Mines Field. Here's what A. K. Showalter, in charge of that station, has to say about pilots who call for the latest weather reports.

"The average pilot is over-optimistic about the weather. He is reluctant to accept it as unflyable.

"Our average telephoned request for weather is not specific enough for us to know what to report. Many a pilot merely asks what the weather is in, say, Las Vegas, Nevada, and doesn't tell us when he plans to leave, his route or his type of plane. Then we have to 'pump' him for further information before we know what to give him in the way of weather. Then when a pilot finds our report 'wrong', he doesn't see his part in the 'error'.

"We should know the destination, time of take-off and stops planned, the cruising altitude and speed and whether or not the ship has radio, blind-flight instruments and de-icers. Then we can give the pilot all the weather information he needs for the specific trip.

"We certainly aren't going to tell a *Cub* pilot that he can fly on-top at 20,000 feet. However, if, for instance, the CAA Flight Test section calls us for weather in which to test new de-icing equipment, we'll tell them where they can find it."

When the weather factory starts working overtime, the older, want-to-live-a-little-longer pilots like Ben Hazelton look out the window of their fog-bound weather station and mutter, "Needle, ball and—Oh Hell! Let's stay on the ground."

Air Training Station, USN

(Continued from page 32)

enter the Preflight School where, in addi tion to their first indoctrination in Nava aviation, adjustments are made to brin the individual's education up to a par wit that of the Academy graduate's. This i important, for by the time the traine finishes NATC's 18-month course, he mus be able to hold his own with graduates o the Naval Academy's four-year course.

The second phase of the program i Basic Training, carried on at Pensacola where the student gets his first flight in struction in an SNJ and learns to solo. H is taught acrobatics, formation flying, pri mary combat and aerial gunnery. Groun school instruction covers aerology, com munications, electronics, engineering, an (with heavy emphasis) navigation. Th high point of Basic Training comes whe the student makes his first five carrie landings and take-offs. The carrier (unde way in the Gulf of Mexico) looks from th air like a "postage stamp on the waves during that first tense approach; but eac man knows that this is the focal point o all his training for a place in carrier avia tion. With this dramatic experience behin him, he is ready for Advanced Training.

NATC Advanced Training is now cen tered at Corpus Christi, Texas. Flyin service-type planes (the F6F *Hellcat* an the F4U *Corsair*) the student is brough to high proficiency in the use and unde standing of special equipment an weapons. While the majority of studen continue training as carrier pilots, smaller number begin training in mult engine aircraft, and fewer still get specia ized training in the operation of aircra from cruisers and battleships.

The training of several thousand your Naval aviators each year, however, repr sents only one small part of Admir Reeves' multi-million dollar operation. Th second and no less important compone of his command is the Naval Air Tec nical Training Command (NATTC) whi turns out the officers and men skilled all the specialties which support Nav aviation.

The third and largest component of th Naval Air Training Command is Air R serve Training (NARTC) with headqua ters at Glenview, Ill., and activities locat at 25 stations throughout the Unit States. The Organized Reserve at prese has some 8,400 officers and 24,000 enliste men. These are organized as carrier a groups composed of fighter, attack, an torpedo squadrons, with necessary patr plane and air-transport squadrons and su porting personnel.

Members of the Organized Reserve a required to attend 48 drill periods p year, plus a 14-day period of active du preferably with a Fleet organization. T objective is to maintain an individual pr ficiency standard which will enable t Organized Reserve, in case of natio emergency, to join the active fleet witho delay or reorganization.

Hard-headed, dollar-conscious "Bla Jack" Reeves "sits on top" of the NART with a vigilance that sometimes makes I staff officers believe that reserve traini

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Carriers Can Do

(Continued from page 52)

tight radar "fence" around the fleet at desired distance. It should be noted heavy attacks by large numbers of planes can be readily detected at much ater ranges than single attacks of small lanes. Thus it can be seen that the e attacks give earlier *warning* and per- launching of additional interceptors le the small attacks are intercepted er to the fleet but can be handled by combat air patrol already in the air directed to the incoming attack by tronic means.

The important thing that we note about situation is that fighting off attacks n large numbers of airplanes, regard- of performance, is never impossible vided we have adequate numbers of lanes and properly deployed radar ens. Against even the most all-out at- s imaginable, it is perfectly possible eep sufficient number of fighters con- ally in the air to meet the incoming cks so that the attackers are inter- ed about 50 miles from the task force. he question of usefulness of the naval dication of air power is one of econom- Just so long as the number of fighters ssary to protect the fleet and the car- to support them is reasonably re- l to the offensive effort which we can ver, the task force is economic. For nple, if two or three carriers are re- ed to supply sufficient fighters to pro- the protective screen, a five-carrier force would be considered very eco- ic. Of the five carriers involved, two carrier loads could be devoted con- ally to offensive operations. On the r hand, should the technological ad- es of our carrier aircraft and their orting units not be kept up with those e attacking airplanes, it is conceivable t the task force might become uneco- ic and require a vast number of car- in order to deliver only a feeble sive punch. Thus the carrier exploita- of air power never becomes ssible, but only uneconomic. And, that it only becomes uneconomical r research and development program restricted as to prevent our airplanes exploiting the art of aerial warfare lly as does the enemy.

ne more point should be made in the lopment of this picture of how the er task force can protect itself. Note within the 50-mile radius circle of protective fighter screen it is possible lace large numbers of carriers and r ships. That is, as we find it neces- to add defensive fighters to our en we simply assign additional carriers h supply these fighters without in- ing the requirements for defense. , a three-carrier task force might sup- bout 300 airplanes and require 200 for ase. If we add two carriers to this, till require only 200 for defense but ow have 500 airplanes available. In fashion, we have increased the total sive ability from 100 airplanes to 300 anes—300 per cent. This is the key, to *how* the carrier task force protects under varying conditions of enemy at- . The requirements for defense *do not* change as we increase the number of carriers while the airplanes are increased directly. To establish the size of our task force we first assign sufficient carriers to provide for all the necessities of defense under any conditions that we wish to operate. Additional carriers are then assigned which provide the entire task force with a protective striking potential, since they do not increase the requirements for defense.

As we look over the detailed analysis above of how the carrier task force defends itself, we can see that it involves the knowledge of some information not heretofore available to very one.

First of all, we must understand the effect of distance on the effectiveness of our air power.

Then we must understand that the carrier task force defensive requirements do not increase substantially with size.

From these, we can begin to grasp the picture of how the carrier task force is able to operate as a unit against almost any aggregation of land-based air power; but we also can see how the single carrier would, under some circumstances, be unable to provide for its own defense. This explains several things. This explains first why so many people are quick to say that it is "obvious" that a carrier cannot operate under land-based air. It also explains why the British carrier operations of World War II were so slow in getting started. It also explains the rapid increase in our own carrier operations when our production of these craft finally was brought, in the latter phases of the war, to the point where we were able to operate the large task forces with *many* carriers. We can now see the importance of our fleet of big carriers and the necessity for keeping them on hand even though in mothballs. We can also see the necessity for keeping our task force economic by continued and intense effort in the field of research and development to provide better men, better ships and better radar. To this we might add the importance for our continued training to provide better men. These are the things which the postwar Navy provides: the continued development of material, techniques and the training of men.

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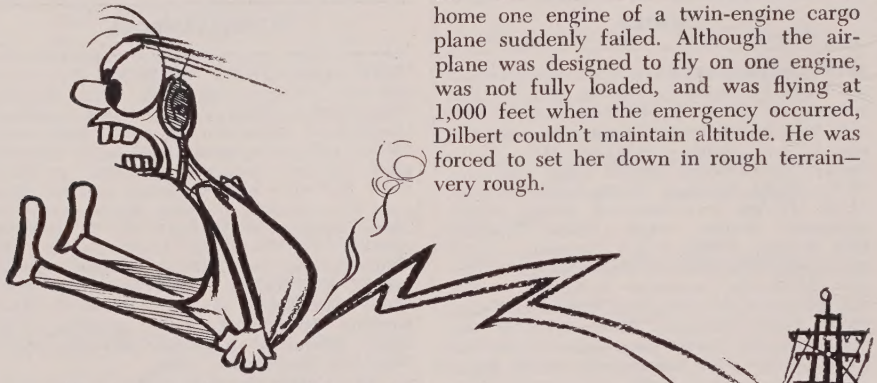
Dilbert

(Continued from page 43)

during the war, near the end of a combat patrol flight, he saw two planes in the distance. Knowing they could only be enemy, he signalled his wingman and gave chase. He was unable to close the range, however, and was almost out of gas before he discovered that the two enemy planes were only two dirt specs on his windshield!



"Don't burn all your britches behind you"

Hot Stuff—Did you know that broken power lines are dangerous? Whenever overloads, shorts or grounds have tripped the automatic circuit breakers, it is standard practice to re-energize these lines at intervals, either by robot or manual control. This procedure may continue until the location of the trouble is found.

Hence, when an aircraft has broken or is in contact with such wires, the power company should be notified immediately. Always consider any broken power line as "alive" until a representative of the power company has given assurance that the current has been cut off.

If you are the occupant of a plane in contact with a power line, get clear, but quick. Of course, the best way to avoid giving yourself the hot seat is to stay clear of these electric circuits in the first place.

"Use your ear flaps to heed Flap Facts"

Flap Speed—Dilbert was practicing touch-and-go landings at an outlying field. Using flaps, he made a good landing short of midfield, then gave her the gun again.

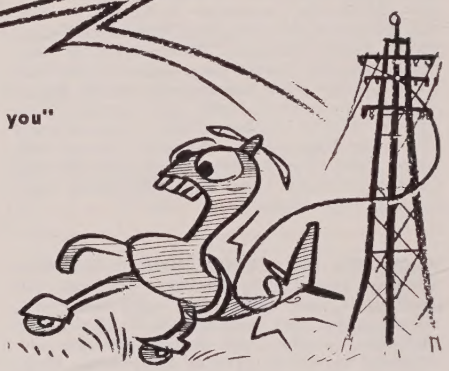
His take-off climb seemed slow, so he raised his flaps, "to decrease his drag," he later said. The airplane immediately started to settle, then the left wing dropped. She cartwheeled upon hitting the ground. About the time Dilbert stumbled clear, the plane burst into flames.

As usual, Dilbert was half right. There *is* less drag when flaps are raised, hence the speed will increase. There is also loss of lift when flaps are raised, thus allowing the airplane to stall at a higher speed.

These two flap effects do not offset each other. When flaps are raised, the decrease in lift is effective immediately, but it takes an appreciable interval for speed to build up. Hence the danger of retracting flaps near stalling speed.

Dilbert isn't the only guy who has almost been burned by this same mistake—this knowing only half the answer. Almost is never enough in aviation.

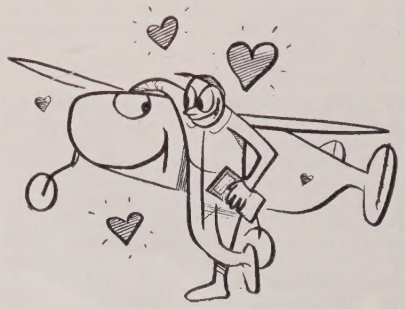
Too Late For Practice—Ten miles from home one engine of a twin-engine cargo plane suddenly failed. Although the airplane was designed to fly on one engine, was not fully loaded, and was flying at 1,000 feet when the emergency occurred, Dilbert couldn't maintain altitude. He was forced to set her down in rough terrain—very rough.



Merely knowing how to take-off and land doesn't qualify you as a pilot; you've go to know how to handle your airplane under all circumstances. In this case, even with one engine out, there was no excuse for wrecking the plane. Dilbert just didn't know his stuff.

In the first place, he wasted precious moments trying to start the engine. He was slow in adding power on the good engine. He never did feather his propeller. The flight engineer opened a hatch preparatory to bailing out. All this extra drag so reduced speed as to require full throw of the rudder, thus creating more drag. Even a good pilot couldn't have maintained altitude in this condition.

The winning jockey in a horse race is usually the one who knows how to get the most out of his mount. In aviation, the winning pilot is the one who knows how to get the most out of his plane because he knows *all* its flight characteristics. You can only become adept at single-engine operation through practice, and it's too late for that when suddenly confronted with the emergency.



Air Training, U.S.N.

(Continued from page 58)

is his pet concern. Reeves can readil explain his attitude, the reserve is at onc one of the most valuable components c the Air Navy and the most difficult t manage efficiently.

"This large body of Naval aviators an enlisted men was trained originally a enormous public expense," he says. "Th nation has a tremendous stake, amountin to billions of dollars, in the training an experience of these men. The job of th NARTC is to maintain that proficienc which otherwise would be lost within few years. We simply cannot afford waste any part of this skill."

An important aspect of Reeves' strean lining of the Naval Air Training Commar last year involved the introduction of novel "operational statistics" plan and system of cost accounting. Under the st tistical plan, current reports from a training organizations are translated in graphic "bar charts" which show at glance such factors as operational aircra student flight time, instructor flight classroom time, accident rates and cause etc. Each factor, as currently operatin is related to a desired standard based c experience. These current statistic mounted on large cards and displayed c an easel, form the basis of Admiral Reev weekly staff conferences. Any operation lag or deficiency glares down the tab inescapably. The Admiral asks "what fo and the responsible staff officer reports.

The cost accounting system is wh really floors the visiting businessmen. T them it is all the more remarkable becau it is operated by regular personnel in t course of regular duties and without the a of "fiscal specialists." Not only does th system keep tabs on such readily charg able costs as pay and allowances, the in tial cost of equipment, costs of fuel, c overhaul, etc., it also digs out and pi rates the hidden costs of training. So t professional accountant who takes a cl look at NATC's current reports is imme ately impressed by the fact that he is de ing with realistic figures and not just fis fancies that have been worked up to pro a point.

To many a wartime flyer in the Paci area much of this will not be news, sir it largely concerns the same "Black Jac Reeves who, employing similar metho streamlined the Naval Air Transport Se ice and raised it to a peak of efficien that was talked about far outside Na circles. What is newsworthy now, ho ever, is that this tight, realistic mana ment is applied to the basic command the new Air Navy at a time when it hea into the most crucial period of its histo

For the new Navy is set to play a uniq and highly specialized role in future power, born of sea power highly modif by the newer tactics of the air. Traini men who will be capable of executing t Air Navy's mission and thereby of realizi the unique potentialities of Naval power is a task that could be both comp and costly. Fortunately, both for the sa of efficiency and economy, the business now under the management of "Bla Jack" Reeves.

inged Fire-Power

(Continued from page 29)

ineffective but, if they are recovered e enemy, their design principles may mpromised, thus reducing the effec- ess of all mines of that type. And ding close air-support to amphibious ng operations anything less than oint accuracy can possibly cause more lties to our own forces than to the y. While it's the hits that pay off, s in the mind of the designer is the ledge that ordnance equipment must fe for the user as well as destructive enemy, and, finally, the enemy must, all possible, not know what hit him! dnance items installed in Navy planes he product of many years of experi- and painstaking engineering develop- s.

craft machine guns larger than .30 r were first used by the Navy in the 1920's. The fixed synchronized .50 r guns immediately became standard ghter armament, but it took over 12 of intensive development before this was developed to the peak of ncy it achieved in World War II. Navy's first heavy dive bombers were n service in 1933 and the first worth- aircraft torpedo, the Mark 13 which ne a weapon of tremendous power g World War II, went into serv- n 1936. Rockets found their place viation ordnance during the sec- World War and aircraft rockets d from the 2.25 subcaliber training t to the 11.75 *Tiny Tim* weapon gives the aircraft from which it is hed the firepower of a 12-inch gun. nly guided missile to see service in l War II was the Bureau of Ordnance ored *Bat*, a radar homing glider carried a 1,000-pound bomb.

ent improvements in aircraft per- nce and tactical utility are proving great stimuli to the development of viation ordnance equipment. While s of new equipment may not be sed at this time, it is interesting amine selected items of aviation nce for trends which are primarily ed by the advent of high-speed, high- de, all-weather aircraft.

capitalize on the advantages of sed speed, emphasis is being placed reasing the performance of guns in of the size and velocity of bullets ne rate of fire. Higher bullet velocity oe attained by improving the shape e bullet itself and by increasing the er charge. Increasing the number of s fired per minute without over- g aircraft with additional guns, how- requires departure from conventional ine-gun design. The 20-mm aircraft ne gun is now replacing the .50- r gun in new Navy aircraft.

gress is being made in the field of llants for rockets and for Jet-Assisted Off applications. Projects aimed at sed velocity and effectiveness of s are nearing completion.

v bomb requirements are receiving l attention in current programs. v designs for air-launched torpedoes asize improved propulsion and the f homing or target-seeking devices.

Design and development of new gun and bomb fire-control equipment for modern high-performance airplanes present the most interesting as well as the most difficult problems associated with aviation ordnance. High aircraft speeds reduce the time available for pilots to select targets and make an attack. Accordingly, the design trends of aircraft sights must reduce the time required to solve the intricate fire-control problem. The same problem applies not only to fighters but to defensive armament in turrets as well. The decrease in visibility at high altitudes as well as increase in speed make necessary the use of radar or other aids for detection and sighting.

One of the outstanding products of Navy sponsored research during World War II was the radio proximity fuse, a minute radar set designed to fit into the nose of a projectile and to initiate detonation upon is closest approach to its target. It is now being tailored for a variety of types of ammunition and will undoubtedly be an important component of new weapons under development.

The importance of dive and glide bombing steadily decreases as aircraft speeds increase and the new technique of "toss" bombing is expected to gain in importance. "Toss" bombing is as effective as glide bombing but is much safer for both pilot and plane. The pilot starts a powered glide approach toward the target for a few seconds but then, instead of continuing in a glide, he pulls up and a computer automatically releases rockets, torpedoes, or bombs at the correct instant.

As the performance of airplanes improves, automatic control techniques to perform precise offensive and defensive functions becomes more and more essential. The ultimate example of this is the most advanced type of ordnance—the supersonic guided missile. Taking advantage of its background of experience in supersonics, simple guidance systems utilized in torpedoes, and its development of the *Bat*, the Bureau of Ordnance is pursuing the development of air-to-air and air-to-surface guided missiles as part of its missiles development program.

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